MAY RIVER WATERSHED ACTION PLAN

amec

CENTER FOR WATERSHED PROTECTION

WARD EDWARDS

THOMAS & HUTTON

NOVEMBER 1, 2011

The understanding and approach toward planning in the May River is both complex and challenging, but should proceed with an eye toward a cohesive and coordinated framework for implementation. An Action Plan for the May River Watershed includes a number of specific elements that must be implemented with respect to three time horizons: the short-term, the medium-term and the long-term. This watershed action plan provides a framework for implementing the many suggestions, statements, goals, objectives and visions of the people that call the May River Watershed home.

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1

2.0 PURPOSE AND SCOPE 5

3.0 BACKGROUND AND INVENTORY 6

3.1 IMPORTANCE OF BLUFFTON AND THE MAY RIVER SOCIALLY, ECONOMICALLY, AND ENVIRONMENTALLY TO THE REGION 6
3.2 CONSISTENCY AND ALIGNMENT OF PLANS 7
3.2.1 Compare and Contrast Analysis of Existing Plans 8
3.2.2 Matrix, Schedule and Inventory of Applicable Watershed Studies 12
3.2.3 Existing Conditions Watershed Report 12
3.2.4 Recommendations based on Analysis of Plans 14
3.3 TOWN POLICY AND ORDINANCE ASSESSMENT 16
3.3.1 Current Standards Review and Recommendations to Zoning and Development Standards 16
3.3.2 Incentives to encourage volume or other water quality controls 22
3.3.3 Sustainable Development and Transfer or Purchase of Development Rights Policies 23
3.3.4 Land Acquisition Strategy/Condemnation Policy 26
3.3.5 Sewer Policy 26
3.3.6 Design Storm Recommendations for Development 30
3.3.7 Wildlife Management Policy 31
3.4 WATERSHED INVENTORY 34
3.4.1 Delineate May River Watershed 34
3.4.2 Impervious Surface Map (current and projected) 36
3.4.3 Watershed Analysis 38

4.0 ASSESSMENT AND IMPLEMENTATION 39

4.1 MAY RIVER WATERSHED INDICATORS 39
4.2 MAY RIVER WATER QUALITY MONITORING PROGRAM 40
4.2.1 May River Water Quality Trend Analysis 40
4.2.1.1 DNR Recommended Sampling Stations and Map 41
4.2.1.2 DNR Recommended Parameters 42
4.2.1.3 DNR Recommended Sampling Regimen 42
4.2.2 Hot Spot Identification and Targeted Retrofits 43
4.2.2.1 Hot Spot Identification Map 43
4.2.2.2 Hot Spot Attributes 44
4.2.2.3 Matrix of Types of Targeted Project/Retrofit Options 46
4.2.2.4 Map of Targeted Project/Retrofit Options 56
4.3 RETROFIT OPPORTUNITIES 57
4.3.1 Identification of Types of Projects 58
4.3.2 Prioritizing of Structural Projects in Need of Retrofit 59
4.3.3 Prioritizing of Non-Structural Projects 61
4.3.4 Identification of Specific Projects for Retrofit 61
4.4 TIMELINE OF IMPLEMENTATION SCHEDULE 74
4.5 COMMUNICATION AND MARKETING 81

4.5.1 Communication/Marketing Plan Development 81
4.5.2 Communication/Marketing Plan Implementation 83

5.0 FINANCIAL MECHANISMS AND ADMINISTRATION 85

5.1 Financial Analysis of the May River Watershed 85
5.2 Expected Funding Requirements (Budget) with Scope Summary 86
5.3 Funding Analysis of the May River Watershed 89
5.3.1 Funding Mechanisms 89
5.3.2 Matrix of Funding Opportunities 100
5.4 Administration 106

6.0 SUMMARY AND NEXT STEPS 124

REFERENCED PUBLICATIONS 126

APPENDICES (Appendices being compiled and will be added as they are completed)

APPENDIX A – Impervious/Pervious Study
APPENDIX B – 319 Project Overview
APPENDIX C – CWP Tools
APPENDIX D– Miscellaneous Maps
APPENDIX E – Ordinance Summary
APPENDIX F – Action Plan Addendums
APPENDIX G – Others as Needed

FIGURES (Figures being created and will be added as they are completed)

Figure 3-1: May River – Plan History

TABLES

Table 1-1: Short-Term Actions
Table 3-1: Existing Plans
Table 3-2: Matrix, Schedule and Inventory of Applicable Watershed Studies
Table 3-4: Summary of Impervious Study Results
Table 4-1: Potential Strategies for Pollutant Sources of Interest
Table 4-2: Recommended BMPs
Table 4-3: General Stormwater Project Concepts
Table 4-4: Projects Included in Current (FY 2012) Town Plan
Table 4-5: Projects for Newer Neighborhood Developments
Table 4-6: Projects for Older Neighborhood Developments
Table 4-7: Project Development in All Neighborhoods
Table 4-8: Review/Update Development Policies
Table 4-9: Phase I Implementation Schedule
Table 4-10: Phase II Implementation Schedule
Table 4-11: Phase III Implementation Schedule
Table 4-12: Phase IV Implementation Schedule

Table 5-1: New BMP Short Term Project Implementations
Table 5-2: Septic, Wildlife and Varying Short-Term Projects for Implementation
Table 5-3: Funding Mechanism Summary
Table 5-5: Potential Partners
Table 5-6: Potential Responsibilities for Each Project Area and Project Type

1.0 Executive Summary

The Town of Bluffton is a coastal community with strong historical ties to its local water body, the May River. The May River is significant to the community today for a number of reasons, including:

- ✓ its historic and cultural uses;
- ✓ its aesthetics and views which add to the quality of life for its citizens;
- ✓ its numerous natural resource populations that are directly harvested and utilized by local and regional residents;
- ✓ its economic impacts, both direct and indirect, to the community; and
- ✓ its Outstanding Resource Waters (ORW) designation from the SC Department of Health & Environmental Control – Environmental Quality Control's (SCDHEC-EQC) Bureau of Water for a high level of water quality.

In the past 20 years the Town has grown dramatically in both size and population. Due to the rapid development within the May River Watershed rising fecal coliform levels in the River's headwaters has resulted in closing portions of the River to shellfish harvesting. Rising fecal coliform levels are a clear indicator of deterioration of the health of a watershed. The Town of Bluffton, along with Beaufort County and local citizens, will work to take action using the May River Watershed Action Plan to improve conditions in the May River prior to further deterioration.

The May River Watershed Action Plan was developed to:

- ✓ Provide a strategy for assessing problems and implementing solutions to restore shellfish harvesting in the May River.
- ✓ Provide a strategy for assessing and implementing preventative measures to protect the May River from future degradation.
- ✓ Identify opportunities for land purchase, conservation easement purchase, and public, private, and public/private opportunities for retrofit projects.
- ✓ Establish priorities, identify funding opportunities, coordinate specific partners and policies (i.e. ordinance changes), and establish timelines such that the Town can use this information as a business plan to be implemented with other Town annual Capital Improvement and Budgeting programs.
- ✓ Serve as a template for other area watershed action plans.

The Action Plan will not be successful as a static, stand-alone document. It is intended to be a living document with frequent updates and modifications. It will evolve over time so that successful recommendations and projects are highlighted and expanded on, while less successful and ineffective concepts are removed.

The Action Plan must maintain consistency and alignment with other official plans and guidance documents, with the goal of protecting the May River Watershed. In Section 3.3, policies and ordinances that are needed to promote recommended elements of the Action Plan

were assessed, indentifying areas where new or improved policies should be considered. The primary focus of the recommendations center on:

- ✓ Promotion of Low Impact Development (LID) and runoff reducing techniques
- ✓ Incentives to encourage stormwater runoff volume reduction
- ✓ Coordinate with developers and property owners to promote the Town's Transfer of Development Rights (TDR) Program, incentives, and conservation easements

Sustainable, environmentally conscious communities can be maintained using smart growth practices. The Town has used and implemented smart growth tools, such as a TDR Program, as a part of their policies and plans to protect the May River, offering incentives for sustainable development. The Town's UDO discusses the TDR Program, as well as the incentives offered. Continued promotion and use of the TDR Program will aid in maintaining development patterns that are consistent with the Town's Growth Framework Map, Map 4 in Appendix D, which was created to target desired development locations specifically selected to protect the Town's natural resources.

An important part of any watershed action plan is maintaining an inventory and analysis of its drainage area and understanding how it works as a whole. The Town has delineated the May River Watershed and is currently working on a detailed sub-basin delineation, including flow paths and drainage patterns. The Town has also completed an impervious surface analysis for the watershed. Together these two analyses will form the framework of a drainage and pollutant transport watershed model. Once created the model will provide the ability to analyze the impacts of an individual scenario or project on the entire watershed prior to implementation.

Extensive monitoring has been conducted within the May River Watershed showing an increase in fecal coliform levels since the mid to late 1990's. While the current and past monitoring has provided much needed information, more coordinated efforts between the Town and adjacent jurisdictions can be implemented that build on some of the existing programs. As a better understanding of the pollutant loadings is gained from the collected data, future monitoring efforts or research should be structured around clear and focused questions.

Monitoring efforts have indicated hot spots of higher fecal coliform concentrations. The hot spot locations are the target areas of future project recommendations. These recommendations and projects are focused around the following:

- ✓ Septic/Sewer/Reuse Programs/Project
  - ❖ Connect septic areas to sewer
  - ❖ Septic Inspection and Maintenance Program
  - ❖ Septic System Cleaning Incentive Program
  - ❖ Septic Policy/Ordinance
- ✓ Wildlife Programs/Projects
  - ❖ Conducting a wildlife survey
  - ❖ Hunting/culling
  - ❖ Create wildlife corridors
  - ❖ Installation of "pick up after pet" signs, as well as pet waste stations

- ✓ Stormwater BMP/Retrofit Projects (shown on May 7 in Appendix D)
- ✓ Education and Ordinances

The Stormwater BMP Pilot Projects are key restorative recommendations to reduce fecal loading into the May River. While preventative measures such as ordinance or policy revisions are aimed at minimizing future fecal loadings, restorative measures are specifically for reducing current fecal loadings to the river. The Stormwater BMP pilot projects are critical to this action plan for both short-term and long-term goals in the following ways:

- ✓ Their success will have an immediate, positive impact on the river
- ✓ The results and data collected will aid in selecting and implementing future restorative projects

Specific projects have been identified near fecal hot spots and need to be ranked based on multiple factors. These projects are discussed in greater detail in Section 4.3 and shown on Map 7 in Appendix D. Some projects could require a partnership to complete, which could make them more difficult to implement. However, these projects were not excluded or lowered in priority due to the partnership requirement.

One of the biggest threats to any watershed improvement/protection plan is taking early meaningful steps. Often the full list of projects needed to completely restore/protect a watershed can overwhelm the decision making process and prevent improvement from taking place. Therefore, recognizing that all priority projects have been identified as such due to their anticipated performance, their rate of implementation becomes an important factor as the cumulative loading reductions will be higher due to earlier implementation of projects.

A timeline for all projects and programs has been identified in Section 4.4, to allow for the proper policies, partnerships and funding mechanisms to be developed for successful implementation. The projects and programs have been categorized as follows:

- ✓ Short-term projects/programs in Phase I (year 1-3 of plan implementation)
- ✓ Medium-term projects/programs in Phase II (years 3 – 5), and
- ✓ Long-term projects/programs in Phases III and IV (years 5+).

The Action Plan has been developed so that immediate and effective actions can be taken to improve water quality within the May River and its watershed. Some of these include:

- ✓ Rain Barrel/Rain Garden Program
- ✓ 319 Program Septic System Inspections/Pump Outs
- ✓ Pet Waste Stations
- ✓ Social Marketing Campaign
- ✓ TDR Program
- ✓ Stormwater BMP Pilot Project

The Action Plan and its recommendations will require support and understanding from the local public and the development community. The current 319 Program grant's social marketing

campaign should be the first step in increasing awareness among residents that their activities and behavioral changes can impact the water quality of the May River.

In addition to the 319 Program social marketing campaign, an education program should be implemented as well. When used in conjunction with the Action Plan projects, it can raise awareness and encourage stakeholders to take action to improve water quality in the May River.

In order to be economically viable and successful the Action Plan will require a wide variety of funding mechanisms. It is not feasible that a single funding source will provide adequate support for implementing all aspects of the Action Plan. Therefore, the broad range of potential funding sources must be understood within the context of the Action Plan. This will allow decision makers to properly pursue and allocate capital for projects in the most efficient manner possible. There are a multitude of opportunities that are discussed in Table 5-3 to evaluate and consider, including, but not limited to:

- ✓ Municipal programs and funds, including the local Capital Improvement Program
- ✓ Local Authorities/Opportunities
- ✓ State Authorities/Opportunities
- ✓ Federal Authorities/Opportunities
- ✓ Non-governmental Organization Funding
- ✓ Donated in-kind services, supplies, or property from private sector/non-profit organizations
- ✓ Partnerships

Partnering is a critical element of this Action Plan, and has been responsible for much of the progress that the Town has made to date on the May River. All of the project and program types will require some form of partnering, whether it's land acquisition/access, funding or in-kind services, or general support to commit Town funds. Each specific project should have partnerships and responsibilities identified during the feasibility study to insure that that they can be properly planned and assessed. Partners can then be notified and included during the preliminary stages so that they fully understand their roles and responsibilities. Table 5-6 identifies potential partners and responsibilities for a variety of projects recommended throughout the Action Plan.

The May River Watershed Action Plan provides the Town of Bluffton with strategies to restore the May River to full shellfish harvesting status, while also implementing preventative measures to protect the river from future degradation. Past experience has shown that immediate and present action is among the best recommendations to improve water quality within a watershed. Therefore, it is critical to implement projects early on to achieve positive short-term results. This in turn should aid in developing community supported long-term strategies to restore and protect the river, as well as future partnerships and funding opportunities. The Action Plan must be used as a business plan so that the Town can monitor progress continually. The Plan can serve as an example and starting point for other watersheds, to facilitate future action plans and ensure improved water quality throughout the Town and its surrounding areas.

2.0 Purpose and Scope

The May River Watershed Action Plan was developed to:

- ✓ Provide a strategy for assessing problems and implementing solutions to restore shellfish harvesting in the May River.
- ✓ Provide a strategy for assessing and implementing preventative measures to protect the May River from future degradation.
- ✓ Identify opportunities for land purchase, conservation easement purchase, and public, private, and public/private opportunities for retrofit projects.
- ✓ Establish priorities, identify funding opportunities, coordinate specific partners and policies (i.e. ordinance changes), and establish timelines such that the Town can use this information as a business plan to be implemented with other Town annual Capital Improvement and Budgeting programs.
- ✓ Serve as a template for other area watershed action plans.

The May River Watershed Action Plan utilizes the significant amount of available information regarding the watershed and the May River itself, as well as lessons learned from previously implemented actions and BMPs within this watershed and similar watersheds, to develop a strategy with specific short, medium-, and long-term actions for measurable water quality improvement. The May River Watershed Action Plan will allow the Town of Bluffton to have earlier implementation of projects for short term results and develop community-supported long-term strategies to return the May River Watershed to full shellfish harvesting status.

How to Use This Action Plan:

This action plan has been developed to serve several purposes as described above. It is a living document, and is expected to be updated annually as the identified strategies and tactics become implemented and further developed. It should be noted that as this living document is updated, additional studies and other work products are expected. These work products will be added as appendices or may be included as references to external updates (e.g. monitoring databases, websites). This ensures that future work products will be incorporated in this Action Plan and can be properly utilized, that interested parties can see the technical basis for the recommended strategies and tactics, and will prevent the document from becoming overly cumbersome to the point that it is no longer user friendly.

3.0 Background and Inventory

This section describes the significance of the May River and its importance to the surrounding land uses, previous studies that have been performed on the May River, existing plans and programs that are currently ongoing within the watershed, and recommendations for future actions based on the previous research/actions that have been performed to date.

3.1 Importance of Bluffton and the May River Socially, Economically, and Environmentally to the Region

The Town of Bluffton is a coastal community with strong historical ties to its local waterbody, the May River. Incorporated in 1852, the town was once a summer retreat for plantation owners, but has truly come into its own as a well-established community with a storied past that centers around the river. Bluffton received National Register Historic District status in 1996 for the original one square mile area of town, known locally as the Old Town Bluffton Historic District, which rests on the banks of the May River.

Since its inception, Bluffton has drawn visitors and residents to the bluffs of the May River, making it the commercial center for southern Beaufort County in the late 1800's. The local economy then was tied very closely to the resources of the river. Oyster and shellfish harvesting businesses situated at the water's edge on Wharf Street thrived.

This phenomenon continues today with "The Bluffton Oyster Company" still at the end of Wharf Street. The Bluffton Oyster Company was established in 1899 and in 1999 received an award from the South Carolina Department of Commerce citing it as one of the 10 oldest continuously operating businesses in the state. May River oysters are still noted today for their fine flavor nationwide and revered locally. According to reports from the South Carolina Department of Health and Environmental Control, thirty percent of the oysters consumed in the state of South Carolina come from the May River.

While Bluffton remained one square mile for over 130 years until its first annexation in 1987, today it has grown to approximately 54 square miles and is one of the largest municipalities in South Carolina. While recent growth has increased the town in size and population, preservation of history, culture and natural resources has remained a Town priority. Refer to Maps 1 and 2 in Appendix D, which offer comprehensive information regarding growth within the Town and the May River Watershed.

The Town recognizes that the May River is significant to the community today for a number of reasons, including:

- ✓ its historic and cultural uses;
- ✓ its aesthetics and views which add to the quality of life for its citizens;

- ✓ its numerous natural resource populations that are directly harvested and utilized by local and regional residents;
- ✓ its economic impacts, both direct and indirect, to the community; and
- ✓ its Outstanding Resource Waters (ORW) designation from the SC Department of Health & Environmental Control – Environmental Quality Control's (SCDHEC-EQC) Bureau of Water for a high level of water quality.

All of these facets of the river help provide a sense of community character and pride that is locally, regionally and nationally recognized. The Town's community plans, including the May River Watershed Action Plan, are guiding documents that protect the Old Town Bluffton Historic District and the May River so that these important resources continue to attract visitors and residents alike.

Until recently, few sources of possible impairments to water quality were recognized within the May River Watershed, and even fewer within close proximity to the river itself. While the May River still retains its ORW status, for the first time in recent history, the river has experienced a shellfish harvesting classification down-grade due to an increased level of fecal coliform in its headwaters. According to Beaufort County's Stormwater Management Plan (2006) the headwaters of the May River naturally were the most vulnerable to a possible fecal coliform impairment due to its large drainage area and reduced tidal flow.

Rising fecal coliform levels in the May River are a clear indicator of deterioration of the health of a watershed. The Town of Bluffton, along with Beaufort County and local citizens, will work to take action using the May River Watershed Action Plan to improve conditions in the May River prior to further deterioration.

3.2 Consistency and Alignment of Plans

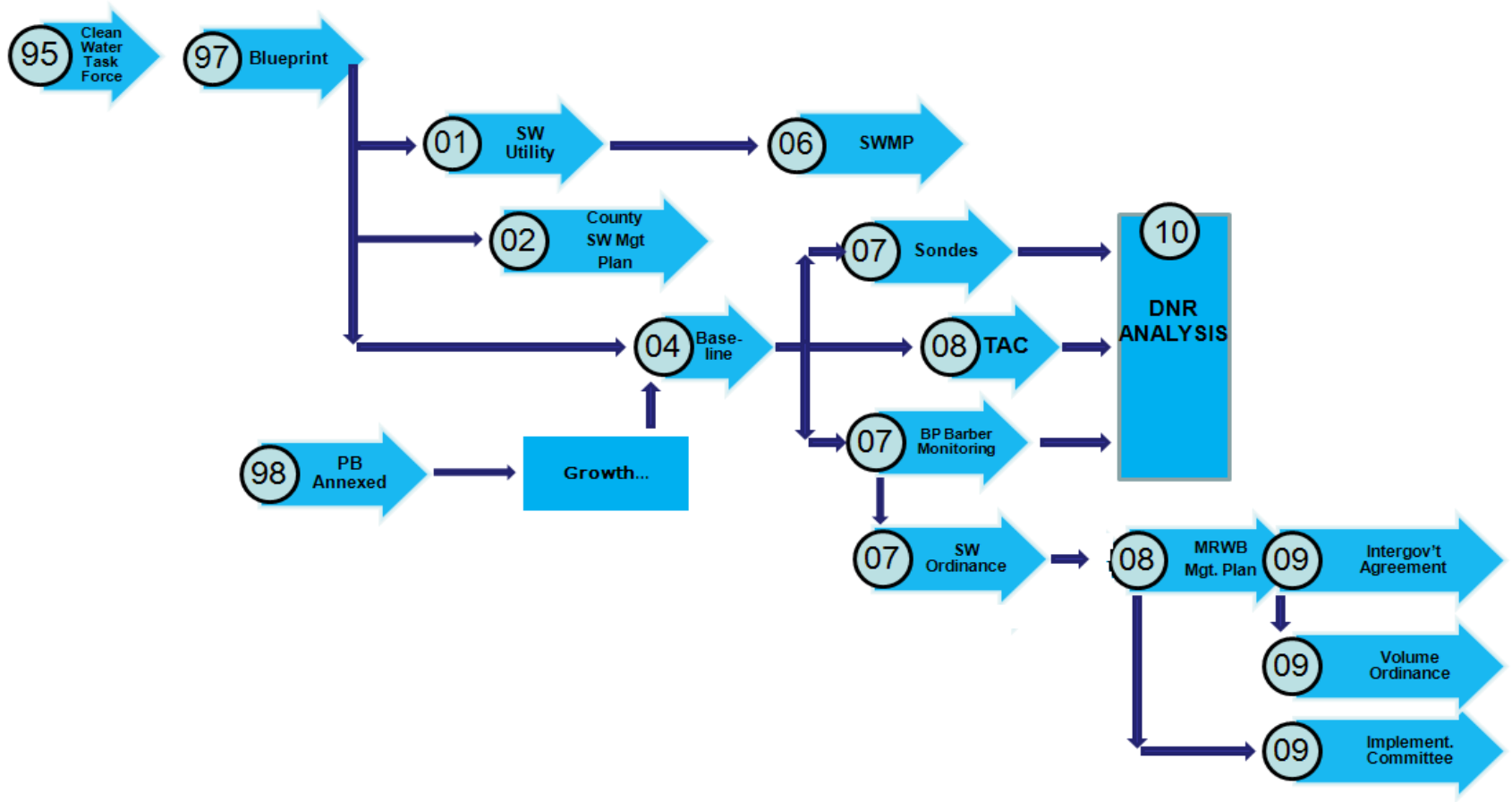
An integral part of ensuring that the May River Watershed Plan is successfully implemented and maintained is consistency and alignment of other official plans and guidance documents. Site specific plans, concept plans, Town of Bluffton plans, and Beaufort County plans must be analyzed and adjusted as needed to ensure each plan is consistent in the goal of protecting the May River Watershed. Map 3 in Appendix D shows preserved and protected areas within Town jurisdiction and the surrounding areas. Map 4 in Appendix D shows areas that have been targeted for incentivized growth within the Town jurisdictional area. The areas shown on Map 4 were selected in part because of their location away from the headwaters of the May River. As plans or guidance documents become outdated, impractical, or redundant they should be eliminated to allow ease in following plans and ease in updating plans to better fit the dynamic May River Watershed. To date, all known existing plans and studies related to the May River have been reviewed.

3.2.1 Compare and Contrast Analysis of Existing Plans

The May River Watershed has been studied extensively and a large amount of data is available. Site specific plans, concept plans, Town of Bluffton plans, Beaufort County plans, and monitoring data from the May River Watershed were reviewed and prioritized based on their relevance for developing the Watershed Action Plan.

A summary of the existing plan history of May River Water Quality Initiatives is presented as a flowchart below. Starting in 1995, the Clean Water Task Force began proactively addressing water quality issues that affect all our rivers and estuaries. In response to the community interest and involvement, the Town's involvement grew following the Baseline Study in 2002-2003 from which fecal coliform was identified as a main pollutant of concern. SCDHEC Shellfish Monitoring results identified that fecal coliform levels were on the rise and if action was not taken soon, shellfish bed closures could be possible. In 2009, shellfish beds were closed for the first time in history in the May River.

Figure 3-1:
MAY RIVER – PLAN HISTORY



Because the May River watershed has been comprehensively studied and a large amount of data was available, plan documents were analyzed and prioritized to determine which ones would be most useful for developing and expediting the implementation of the May River Watershed Action Plan. The plans in the below Table were evaluated and prioritized based on their relevance for developing the Action Plan into the following three categories: high, medium, and low relevance.

- ✓ High Relevance - Documents that provided information on trends throughout the watershed, conclusions about pollutant sources and/or hot spots, recommended actions specific to the watershed, and assessments of actions/policies/BMPs
- ✓ Medium Relevance - Documents that provided information specific to one element of the action plan, similar watersheds/projects, or provided background information
- ✓ Low Relevance - Documents that were redundant, out-dated, or did not directly address the May River watershed

Table 3-1: Existing Plans

Plan / Program	Author	Date	Status	Relevance
Waterbody Management Plan for the May River	SCDHEC-OCRM	2008	Active	High
A Baseline Assessment of Environmental and Biological Conditions in the May River, Beaufort County South Carolina	SCDNR, USGS, NOAA	2004	Complete	High
Town of Bluffton 319 - Program Project - Fecal Load Reduction in the May River Watershed Project	Town of Bluffton	2009	Active	High
Town of Bluffton Phase I - Study and Preliminary Design Pilot Project Design for 319 Grant (BMPs)	T&H	2010	Active	High
Water Quality Concerns in the May River: Analysis of Monitoring Data Collected by The Town of Bluffton and Palmetto Bluff Development	DNR	2010	Complete	High

Table 3-1: Existing Plans

Plan / Program	Author	Date	Status	Relevance
Town of Bluffton Watershed Subbasin Delineation Project	Town of Bluffton	2010	Active	High
Town of Bluffton Impervious Surface Delineation Project	Applied Technology and Management	2010	Active	High
Beaufort County Special Area Management Plan	DHEC/OCRM	2002	Active	Medium
Beaufort County Stormwater Management Plan	Thomas & Hutton Engineering, Co. and Camp Dresser McKee, Inc.	2006	Active	High
Town of Bluffton Comprehensive Plan	Town of Bluffton	2007	Active	Medium
Beaufort County Rural and Critical Lands Program	Beaufort County		Active	Medium
The Blueprint for Clean Water	Clean Water Task Force	1997	Active	Low
Beaufort County Special Area Management Plan Water Quality Monitoring Initiative	Thomas & Hutton, Co.	2001	Active	Low
Okatie River Watershed Management Plan	Applied Technology and Management	2002	Complete	Low
Southern Beaufort County Regional Plan	Beaufort County	2006	Active	Low
Jasper County Comprehensive Plan	LCOG	1995	Active	Low
Jasper County Natural Resources Conservation Plan	Jasper County	2007	Active	Low

Table 3-1: Existing Plans

Plan / Program	Author	Date	Status	Relevance
Bluffton Township Watershed Plan	Coastal Conservation League	2009	Active	Medium

3.2.2 Matrix, Schedule and Inventory of Applicable Watershed Studies

Table 3-2: Matrix, Schedule and Inventory of Applicable Watershed Studies

Plan / Program	Key Water Quality Indicators	Participants	Start Date	End Date	Status
Shellfish Management Area 19 2010 Annual Update	Fecal Coliform	Region 8 Shellfish Sanitation Staff	1/1/07	12/31/09	Completed
Federal Clean Water Act Grant 319	Fecal Coliform	SCDHEC	07/2010	TBD	On-going
Town Monitoring	Multiple	Town of Bluffton	07/2005	TBD	On-going
County Monitoring	Multiple Parameters	County	06/2007	TBD	On-going

3.2.3 Existing Conditions Watershed Report

The May River Technical Advisory Committee (TAC) was established to evaluate the information obtained to date, assist in the identification of development-related impacts, and provide recommendations for alleviating or reversing water quality impacts to the May River. The TAC recommended a statistical analysis of the water quality data to determine if statistically significant changes were occurring in the May River

The Marine Resources Research Institute of the South Carolina Department of Natural Resources (SCDNR) completed this statistical analysis in its report, "Water Quality Concerns in the May River: Analysis of Monitoring Data Collected by the Town of Bluffton and the Palmetto Bluff Development." The report was created in 2010 for the Town of Bluffton and Palmetto Bluff Development. The goal of this analysis was to address three main questions:

- ✓ Are significant changes in water quality occurring in the May River?
- ✓ Are developed drainages acting as significant sources of pollutants to the May River system?

- ✓ What monitoring efforts will be most valuable and feasible to continue into the future?

The following conclusions were provided from the SCDNR Report:

Salinity does not appear to be decreasing (becoming more fresh) in any part of the May River. Year-to-year salinity variation observed in the May River was closely related to precipitation patterns. Fecal coliform bacteria levels were significantly and inversely related to salinity at almost every station. These relationships were strongest in the stations located farther upstream in the May River as compared to those located farther downstream. This could reflect the greater influence of freshwater drainages on the narrower, shallower and lower-salinity upstream portions and the greater influence of higher-salinity seawater on the more downstream portions of the May River. The higher and more rapidly increasing fecal coliform levels in the upper portion of the May River, as compared to the lower portions, likely reflect a combination of water body size and flushing rate, as well as development trends in the different May River watersheds.

Instream fecal coliform levels are closely but not entirely related to rainfall patterns in the southern portion of the river. Increases in fecal coliform levels in recent years occurred during a period of decreasing rainfall and increasing salinities. This suggests either that there has been an increase in the sources of fecal coliforms (wildlife, domestic animals, etc.) rather than an increase in total runoff volume or that runoff has become more episodic.

Analysis of the Palmetto Bluff developed (Phase I) drainages showed little evidence of having degraded water quality when compared to the undeveloped (Phase II) drainages. Fecal coliform concentrations were highest in drainages from undeveloped sub-watersheds and lowest in the impoundment/ pond drainages, but these differences were not statistically significant. Rain events resulted in significantly higher concentrations of fecal coliform bacteria from all drainages, particularly in the undeveloped sub-watersheds where terrestrial wildlife deposits represent the most likely source. During the monitoring period analyzed, the developed Palmetto Bluff sub-watersheds did not show evidence of being a major source of fecal coliform pollution through stormwater runoff. This may be due to a combination of low-density and young age of the developments at Palmetto Bluff, the displacement of wildlife into undeveloped areas, and/or adequate containment and control of stormwater runoff.

Runoff from rain events in the drainages on the Bluffton side of the May River had significantly elevated fecal coliform levels, nutrient concentrations and turbidities when compared to the developed and undeveloped drainages at Palmetto Bluff. Fecal coliform levels were particularly high in the most upstream drainages (Stoney Creek and Rose Dhu Creek). The high fecal coliform levels, phosphorus concentrations, and turbidities in the Bluffton drainages may reflect a combination of land cover/land use and flushing rates in the different watersheds.

As part of a longer-term monitoring strategy for the May River, recommendations included a more coordinated effort that builds on existing programs and includes monitoring in the main

stem of the May River and in targeted creek systems in a coordinated effort between the Town of Bluffton and the Palmetto Bluff Development. Specific recommendations include:

- ✓ Discontinue the existing continuous data sonde program and collect this type of data only as needed for specific targeted studies,
- ✓ Continue to collect data routinely at main stem river stations, but reposition those stations,
- ✓ Monitor the most critical parameters (fecal coliform bacteria, TN,TP, turbidity) and basic water quality measures in the headwaters/drainages of developed sub-watersheds in both Palmetto Bluff and Bluffton,
- ✓ Monitor drainages from at least three undeveloped drainages on Palmetto Bluff,
- ✓ Discontinue monitoring at most Palmetto Bluff Golf Course stations,
- ✓ Sample headwater and creek mouths routinely as well as following rain events,
- ✓ Improve quality assurance/quality control and consistency of sample and data collection among Bluffton, Palmetto Bluff and state monitoring programs,
- ✓ Structure future monitoring efforts or research around clear and focused questions.

Map 2 in Appendix D depicts the planned development within the watershed, along with the protected areas, which shows what the future plans for the May River Watershed entail.

3.2.4 Recommendations based on Analysis of Plans

The matrix below identifies the recommended uses in the short-, medium-, and long-term for the monitoring data completed as part of and presented in the identified plans and programs. The recommended actions and monitoring plans that resulted from the identified plans and programs are outlined in more detail in Section 4.4 – Timeline of Implementation Schedule, which identifies tasks that have been completed or are in-progress in addition to what will be implemented in the short-, medium- , and long-term.

Table 3-3

Plan / Program	Recommended use of monitoring data and plan/program for the May River Watershed Action Plan		
	Short-term	Medium-term	Long-term
A Baseline Assessment of Environmental and Biological Conditions in the May River, Beaufort County South Carolina	Historical comparison to identify trends	Assess lessons learned from implemented recommendations	--
Water Quality Concerns in the May River: Analysis of Monitoring Data Collected by The Town of Bluffton and Palmetto Bluff Development and Weekly Monitoring Program	Provides guidance for continued monitoring to identify and monitor hot spots	Continue implementing monitoring program to identify and monitor hot spots, pollutant trends, and potential BMP locations	Continue implementing monitoring program to monitor pollutant trends and evaluate effectiveness of BMPs
Town of Bluffton Phase I - Study and Preliminary Design Pilot Project Design for 319 Grant (BMPs)	Used to identify location(s) for pilot project	Use to identify pollutant trends in the vicinity of the pilot project	Use to evaluate effectiveness of the pilot project
Town of Bluffton Watershed Subbasin Delineation Project	Use to identify potential contributing sources, hotspots and potential BMP locations	Continue to use to identify potential contributing sources, hotspots and potential BMP locations; update with hydrologic changes from retrofit projects	Continue to use to identify potential contributing sources hotspots and potential BMP locations; update with hydrologic changes from retrofit projects
Town of Bluffton Impervious Surface Delineation Project	Use to identify potential contributing sources, hotspots and potential BMP locations	Continue to use to identify potential contributing sources, hotspots and potential BMP locations; update with impervious changes	Continue to use to identify potential contributing sources, hotspots and potential BMP locations; update with impervious changes

3.3 Town Policy and Ordinance Assessment

The following section provides an assessment of the policies and ordinances that are needed to promote the recommended programmatic elements in this action plan. This will identify the areas where new or improved policies are required to move forward with the Action Plan, as well as noting those that are already in place and can be taken advantage of in the short-term. Additional details are provided in Section 5.0 – Financial Mechanisms and Administration with regards to specific responsibilities that must be assigned to the Town and other partners for specific project types.

3.3.1 Current Standards Review and Recommendations to Zoning and Development Standards

Current Standards Review for Town of Bluffton and Beaufort County

The following existing ordinances for land development were reviewed, and the summary of the value, relevant to the goals of this Action Plan, is presented for each. A complete summary of the stormwater items reviewed is presented in Appendix E:

Town of Bluffton Stormwater Design Manual

- ✓ Provides general stormwater design criteria for hydrologic modeling including:
  - ❖ Rainfall distribution, rainfall intensity curves, basin sizes, design storm and duration.
- ✓ Provides detailed design information and instruction for design of culverts and bridges
- ✓ Provides detailed design information and instruction for the design of open channel flow, including natural channels
  - ❖ This guidance includes maximum velocities within the channels, conveyance volumes and freeboard depths.
- ✓ Provides detailed design information and instruction for the design of stormwater storage facilities – the following elements will support the goals of reduced runoff volumes (not just peak discharges) and filtering runoff from development:
  - ❖ Parking lot, cul-de-sac, and traffic islands shall be designed to be depressed and open to receive stormwater runoff storage and treatment.
  - ❖ For all parking lots, strategically placed vegetated swales or depressed uncurbed bioretention areas between parking stalls shall be constructed for a minimum of 50% (fifty percent) of islands between parking stalls to retain and treat any runoff generated onsite.
  - ❖ Below-ground proprietary structural storage products that are commercially available can be employed to meet both water quantity and water quality goals if approved as part of the stormwater system design by the Administrator(s).
  - ❖ For stormwater detention on parking lots: using the paved areas of the lot to channel runoff to grassed areas or gravel-filled seepage pits. Water from pavement should flow across a grassed vegetative buffer before entering a collection swale, infiltration swale, trench, or basin where the flow will then infiltrate into the ground.
- ✓ Provides detailed design information and instruction for the design of Structural BMPs, including detention, filtration and infiltration

- ❖ All projects shall have in series BMPs and all stormwater management system designs shall contain at a minimum one wet detention BMP, one vegetative BMP and one filter or infiltration based BMP.
- ❖ Projects shall be designed to include a minimum of three BMPs in series to meet the requirements set forth in the Stormwater Management Ordinance. The BMPs shall be selected based on site conditions to maximize their effectiveness.
- ❖ Provides pollutant removal efficiencies for various structural BMPs for TSS, Total P, Total N, and Trace Metals.
- ❖ Referenced stormwater design documents:
  - Georgia Storm Water Management Manual Sediment, Atlanta Regional Commission and Georgia Department of Natural Resources-Environmental Protection Division, 2001 http://www.georgiastormwater.com/
  - Manual of Stormwater Best Management Practices, North Carolina Department of Environment and Natural Resources-Division of Water Quality, 2005 http://h2o.enr.state.nc.us/su/bmp_updates.htm
  - Bioretention Manual, Prince George's Town Programs and Planning Division-Department of Environmental Resources, 2001 http://www.co.pg.md.us/Government/AgencyIndex/DER/ESD/Bioretention/bioretention.asp?nivel=foldmenu(7)
  - Pervious Concrete Pavements, Paul D. Tennis, Michael L. Leming, and David J. Akers, 2004 http://www.concrete.org/pubs/newpubs/pcp.htm

- ✓ Provides design components, design guidelines, maintenance and monitoring, and general plan and profile information, all of which include water quality treatment volume requirements and BMP sizing.
- ✓ Provides engineering worksheets to assist in determining pollutant removal and BMP efficiencies for site specific designs.
- ✓ Provides design information for innovative BMP solutions in Appendix A.
- ✓ Discusses innovative stormwater solutions in Appendix A, such as rooftop practices, pervious pavement, runoff for irrigation, disconnection of impervious area, rain gardens, and swales.
- ✓ Lists the Town's in-series BMPs, including:
  - ▪ Redirecting roof drainage onto adjacent pervious surfaces;
  - ▪ Installing grassed swales on lots with suitable soils;
  - ▪ Installing sunken island in parking lots instead of raised islands with curbs;
  - ▪ Installing pervious pavement (at least 50 percent) in commercial parking lots; and
  - ▪ Installing disconnected drainage where possible.

<u>Beaufort County Stormwater Manual for Stormwater Best Management Practices</u>
The County Manual offers similar information as the Town Stormwater Design Manual. However, the County Manual offers information that may be useful to the goals of the Action Plan, which are as follows:

- ✓ Defines stormwater loading factors for urban development that establishes specific EMC loadings: These EMC loadings were established based on a review of multiple other documents, including nine within the state of Georgia and six within the state of Florida, and include fecal coliform bacteria for various land uses, including:
  - ❖ Open Space
  - ❖ Low Density Residential
  - ❖ Medium Density Residential
  - ❖ High Density Residential
  - ❖ Industrial

- ❖ Commercial

- ✓ Provides BMP efficiencies for extended dry detention, wet detention, infiltration and swales for numerous constituents, including fecal coliform bacteria.
- ✓ Provides a detailed BMP technology criteria matrix that details which type of BMPs should be used for which developments.
- ✓ Provides detailed worksheets for stormwater design for various BMP types

Current Ordinances & Comprehensive Planning Review

Town of Bluffton Unified Development Ordinance (UDO)

This document includes reference to stormwater design and supports the goals of this Action Plan in that it:

- ✓ Officially adopts the Stormwater Design Manual:
- ✓ Mandates that the review process for stormwater plans include a pre-application meeting, stormwater plan review, and submittal of record drawings upon completion:
  - ❖ This allows for earlier interaction and opportunities to add stringent water quality features.
- ✓ Includes the following general requirements which reduce runoff and pollutants:
  - ❖ All development shall disconnect impervious surfaces with vegetative surfaces to the maximum extent practicable.
  - ❖ Stormwater runoff shall be controlled in a manner that:
    - Promotes positive drainage from structures resulting from development.
    - Includes the use of vegetated conveyances, such as swales and existing natural channels to promote infiltration.
    - Promotes runoff velocities and maintains sheet flow condition to prevent erosion and promote infiltration.
    - Limits its interaction with potential pollutant sources that may become water-borne and create non-point source pollution.
  - ❖ Natural vegetative buffers play an integral part in minimizing the volume of stormwater runoff by promoting infiltration and acting as a first line of treatment of water quality pollution. Development shall observe the buffer requirements of Section 5.5 of the Ordinance; or if applicable the relevant development agreement, concept plan, and/or approved master plan.
- ✓ Implements the following key design standards, which are both stringent yet reasonable for the varying soils conditions and information that are available:
  - ❖ All development and redevelopment, including highways, shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the pre-development hydrology of the property with regard to the temperature, rate, volume, and duration of flow.
  - ❖ In areas of Hydrologic Soil Groups A and B, the development shall control and infiltrate the first one inch of stormwater runoff from the entire development or maintain the pre-development hydrology of the property for the Water Quality Design Storm Event, whichever is greater.
  - ❖ In areas of Hydrologic Soil Groups C and D only, the development shall maintain the pre-development hydrology of the property for the Water Quality Design Storm Event.

- ❖ Undisturbed natural areas will not be required to demonstrate that such areas can retain the first one inch of runoff.

- ✓ Implements monitoring policies to ensure performance of designed/constructed BMPs, which require that a developer be responsible for the performance, not just the installation of the required BMPs:
  - ❖ Structural BMPs shall be monitored individually up to 36 months from final as-built inspection for water quality performance.
  - ❖ At least half of the samples gathered will need to be taken within 24 hours of a rain event one-half inch or greater.
  - ❖ If 20 percent or more of the samples fail to meet the water quality, then within 60 days of reporting of such a sample failure, the operator of the stormwater system shall submit to the Town Engineer a corrective action plan stipulating how compliance with the DHEC water quality standards will be met. Violations of any single test parameter shall constitute a failure for that sampling period.
- ✓ Development shall construct permeable paving where soil conditions allow. Requirements for permeable paving are outlined in Section 7.8.2 of the Stormwater Design Manual.
- ✓ Irrigation systems must first make use of all available surface stormwater runoff or other retained or detained stormwater as the water supply. No groundwater wells or use of potable water for irrigation of any kind will be permitted in developments or redevelopments unless it can be demonstrated that alternative sources of irrigation water will not exceed pre-development conditions.

<u>Town of Bluffton Comprehensive Plan 2007</u>

This document contains goals that are consistent with the goals of this Action Plan. Specific examples include:

- ✓ Recommends that Bluffton organize a watershed education campaign with signs announcing entry into a community watershed. Also, recommends fostering community accountability, such as marking storm drains with statements or symbols such as "This flows into the May River."
- ✓ States that Bluffton's Stormwater Ordinance should be used to guide stormwater management based on the community's desire to protect, maintain, and enhance its environment and to protect the health, safety, and general welfare of its citizens.
- ✓ Recommends in the short term to develop watershed and drainage basin plans. Begin with drainage basins that are identified as releasing high levels of pollutants.
- ✓ Recommends to complete recommendations of Environmental and Ecological Assessment of the May River Report in the long term.
- ✓ Recommends supporting Stormwater Utility efforts to complete Beaufort County Special Area Management Plan recommendations in the Medium term.
- ✓ Recommends to Assist Stormwater Utility with establishing water quality protocol in the short to medium term.
- ✓ Recommends continuing monitoring efforts which target and identify point sources in the short to medium term.
- ✓ Recommends pursuing grants and other funds for infrastructure and sewer.
- ✓ Recommend to identify infrastructure projects for a future project lists through a needs study in the short to medium term.

- ✓ Recommends developing and implementing a Town plan for upgrade and repair of Bluffton's drainage system.
- ✓ Encourages the use of innovative stormwater management, such as permeable pavement and LID designs.
- ✓ States that parking lots should have an increased amount of pervious surface in order to minimize stormwater runoff and non-point source pollution. Landscaped islands within off-street parking lots should be required.

Needs Assessment

After reviewing these Town ordinances, the following items are additional topics that should be considered for inclusion in the Town's ordinances to further address water quality improvements:

- ✓ Require a maximum time of land disturbance for new development without specific milestones being met, such as percent stabilization (i.e., provide a temporal limitation so areas are not clear cut and then sit inactive for an undisclosed amount of time).
- ✓ Continue to promote increased perviousness and reduced runoff (i.e. permeable pavement, landscape islands, buffers, etc.)
- ✓ Ensure correlation of septic design standards, which are regulated by DHEC, to water quality and stormwater requirements with regulated Town inspections
- ✓ Implement on-lot LID practices for new residential development, such as not installing downspouts to tie directly into stormwater infrastructure, or utilizing pervious pavement driveways, etc.
- ✓ Implementing a tracking system to track effectiveness of implementation and maintenance of on-site LID practices as part of the annual BMP inspections.
- ✓ Expand the types of innovative LID BMPs in the Stormwater Manual Appendix A to include additional stormwater BMPs, including various structural BMPs, as well as expanding discussion on the current listed innovative LID BMPs, such as rainwater harvesting which would increase the residence time, depressional medians for additional detention, treatment trains, bioretention areas, designing to minimum pavement widths, and vegetated filter strips, which reduce the overall runoff volumes for the watershed.
- ✓ Promote the transfer of development rights programs, incentives, and conversation easements.

Recommended Actions

Based on the review of the current zoning and design standard, ordinances and goals of the comprehensive plan, the following actions are recommended for the Town of Bluffton. Sections 3.3.2 – Incentives, 3.3.3 – Sustainable, and 3.3.4 – Land Acquisition provide details on important tools that need to be employed to support the recommendations below.

- ✓ Continue to address the goals of the Town Comprehensive Plan, and enforce the technical requirements and standards in the UDO and Stormwater Design Manual
- ✓ Continue coordination with the County to implement cohesive design requirements.
- ✓ Continue placing a strong emphasis on volume control:

- ❖ To reduce pollutant loadings to streams the most utilized option is to provide appropriate detention/retention prior to runoff entering the stream. However, a secondary option to reduce pollutant loadings to streams is to reduce overall initial runoff from developments (i.e. pervious pavements, median depressions, rainwater gardens, etc). Therefore, there is potential for the Town to provide additional design information in the stormwater manual, which will provide options for runoff reduction, as opposed to a main focus on retention/detention. This has potential to benefit developers in specific situations where the size of retention/detention facilities could become impractical, along with allowing developers an option in meeting the current stormwater regulations. Thus is it recommended the Town consider adoption of such design standards to promote such practices.

- ✓ The section regarding culverts and bridges design can be enhanced to include main channel culvert barrel sizing (and the use of overbank culverts) that prevent the loss of natural in-stream (or wetland) attenuation that can provide residence times that reduce bacteria loads that reach the May River.
- ✓ The provided guidance regarding design of open channel flow addresses events (10- and 25-yr) greater than those that affect water quality (1-inch to 1-yr). Although channels are typically designed to serve water quantity and not water quality issues, noting that extended detention for the 1-year event can protect the channels and ditches from erosion and can reduce maintenance costs while providing a water quality benefit. This concept is addressed in the Aquatic Protection Criteria of the Coastal Stormwater Supplement to the Georgia Stormwater Manual; CWP & Chatham County MPC, 2008, which is further described below).

In order to implement these above listed recommendations, the Town would need to perform a detailed review of the existing ordinances/stormwater plan, determine the best place for recommendation implementation, and take procedures to adopt new recommendations. This effort would provide specific information regarding design requirements within the watershed, as opposed to the inventory review that was performed with this effort. The result of this effort would provide a detailed analysis of items that could be evaluated to improve water quality within the watershed, such as minimum pavement design width, sidewalk rules and regulations, etc. The Center for Watershed Protection's (CWP) tools can be used to assist in this effort, as described below. This effort could be performed by in-house staff, and is anticipated it would require 0.2 to 0.4 Full Time Employees (FTE) per week to implement.

The CWP has numerous tools available to assist the Town in going through the process of updating their ordinances to reflect the above recommendations. These include:

- The post-construction stormwater manual entitled, "Managing Stormwater in Your Community." This document has many applicable tools and references that would be useful for the Town in adopting revised ordinances. This document is available at the following website, as well as in Appendix C of this document: http://www.cwp.org/documents/cat_view/76-stormwater-management-publications/90-managing-stormwater-in-your-community-a-guide-for-building-an-effective-post-construction-program.html

- Specifically, Table 5.7 (p.5-13) in the post-construction stormwater manual, provides key steps and milestones in developing ordinance as well as the timeframe and responsible/appropriate party for development.
- Tool #1 from the Post-construction guidance manual. This tool is included in Appendix C of this document.
- Tool #3 from the post-construction guidance manual. This tool is included in Appendix C of this document.
- Tool #4 for the codes and ordinance worksheet. This tool is included in Appendix C of this document.

3.3.2 Incentives to encourage volume or other water quality controls

The two main aspects of water quality treatment include reducing the overall amount of stormwater runoff, and treating the stormwater runoff via appropriate BMPs. As stated above, it is ideal to put equal emphasis on both of the aspects, as the more runoff reduction that occurs the less treatment volume requirement there is.

Therefore, it is recommended that the Town incorporate incentives into their ordinances, to encourage the developers, as well as the public, to promote water quality improvements. The two main incentives include a financial aspect, as well as a quality of life aspect. The financial incentive would be beneficial to implement on a large scale with developers, but can also prove beneficial on an individual home level. Financial incentives for consideration include:

- ✓ Reduce Town cost: This can take the form of promoting private entities to implement stormwater improvements (such as in Homeowner's Association areas, Right of Ways accessing private businesses, etc), and thus reducing the Town's project requirement
- ✓ Reduce user fee (individual costs): This can be implemented in the form of giving tax breaks/SW utility fee breaks to those who exceed the stormwater treatment requirements by a specific percentage (i.e., provide additional treatment volume, provide additional reduction of pollutants by a specific percent, provide additional reduction of the overall runoff produced from the development). This can be implemented on individual sites, commercial properties, and new residential developments.
- ✓ Increase quality of development (general fund through revenues and property value): The quality of life incentive would promote a healthier and safer environment for the public, and would ensure extensive recreational uses would continue on the waterways. A quality of life incentive could include the following:
  - ❖ Less nuisance flooding: By reducing the overall volume of stormwater runoff, there is a higher potential that the nuisance flooding areas will be improved, especially in typical (25 year 24-hour and less) storm duration events. This will provide the community with a higher quality of life, and improved access during the rain events to areas that typically contain nuisance flooding.
  - ❖ Cleaner water: By promoting active individual involvement in stormwater management, the overall quality of the May River will increase, ensuring recreational activities will be continued for generations to come.

- ❖ Increase pride in the May River: With the community actively participating in the improvement of the May River water quality, the community will take further pride in their natural resources, and strive to keep them clean on a continual basis.
- ❖ More sustainable and 'green' infrastructure: The development of innovative LID solutions to provide increased water quality for the May River will lead to longer, more sustainable development for the future.
  - For example: The Georgia Coastal Stormwater Supplement (CSS) uses the Runoff Reduction method to prevent the need to mitigate impacts from runoff This standard over-detains the more frequent, shorter duration storm events, such as the 1-yr 24-hr event, to increase treatment provided to the watershed. Likewise, the CSS offers a calculation tool that quantifies reduction in peak runoff rates from typical events (25-yr) due to reductions in impervious areas and installation of BMPs to address water quality requirements. The CSS also shows how to provide credits/incentives to developers who adopt runoff reduction methods (i.e. how this practice can reduce stormwater treatment facility size, thereby reducing the overall construction and implementation cost requirements).

3.3.3 Sustainable Development and Transfer or Purchase of Development Rights Policies

As the Town of Bluffton as grown, so too has the increase in impervious surfaces, which include, but are not limited to, roads, rooftops, parking lots and sidewalks. Previous studies have shown a link between impervious surface coverage and water quality. Specifically, an increase in impervious surface and its associated uses will result in a reduction in water quality. This can be mitigated through treatment of stormwater runoff, as discussed in Section 3.3.2, with retrofit opportunities provided in Section 4.3. However, using Smart Growth practices as outlined in the EPA's guidance document, Protecting Water Resources with Smart Growth, will result in accommodating the future growth of Bluffton while minimizing impervious coverage. The main objective of smart growth is to provide higher population densities in strategically located areas, as opposed to the traditional practice of uncontrolled development resulting in urban sprawl. Concentrating density in specific, planned areas results in creating less infrastructure and compacted lawn, as well as their associated pollution. Conversely, undeveloped open space will be increased when compared to traditional development practices. There are many different planning tools that can be used to encourage development in strategic areas that have been specifically selected to allow for smart and sustainable growth that protects water resources. Some of the planning tools that have been used by the Town of Bluffton to protect the May River include watershed planning, developing a regional comprehensive plan, implementing watershed-based zoning and special development districts, coordinating development and conservation plans, allowing higher densities and density averaging, preserving open space, and allowing for transfer or purchase of development rights.

The Town of Bluffton strives to provide a sustainable, environmentally conscious community. Article 6 of the Town of Bluffton Unified Development Ordinance, *Sustainable Development Incentives*, provides applicants with options and incentives to integrate sustainable growth principles for development.

Article 6 utilizes the Town of Bluffton's Growth Framework Map, included in Appendix D as Map 4. This map was created to set forth a land use vision that assumes that growth should be sustainable as stated in the Town of Bluffton Comprehensive Plan. The Growth Framework Map is structured to suggest patterns of growth into "place types" that are intended to result in a growth pattern that respects the Town's natural resources, historic fabric, diverse housing, access to nature, mixed-use activity centers, street network and neighborhood structure. Place types are made up of centers and edges with varying degrees of residential and non-residential intensity. Centers consist of locations where a range of uses and density establishes context and character. Edges are either natural (such as a wetland, lake, or coastal marsh) or man-made such as a highway, parkway, or utility easements.

The Town of Bluffton recognizes that a growth framework is necessary to prepare for a more compact and sustainable future. The Town further recognizes that certain areas are best suited for a more intense land development scenario while other areas are more suited for a lower intensity of land use. To effectively and efficiently provide public services, attract desired investment, protect property values, and protect key natural resources, this growth framework is vital as the Town of Bluffton increases in population.

As stated above, one of the opportunities available to applicants within the Town of Bluffton that encourages smart growth is the Town's Transfer of Development Rights (TDR) Program. TDR is a way of controlling land use to complement zoning and strategic planning for more effective urban growth management and land conservation. A TDR program is a creative and innovative form of development control. TDR permits a community to encourage the transfer of development potential from areas that the community wants to preserve, called sending zones, to areas that are more appropriate to accommodate increased growth, called receiving zones. The Growth Framework Map shows areas that would be recommended as receiving zones. TDR can aid in accommodating growth within the Town without increasing the overall amount of permitted development. It offers landowners financial incentives for the conservation and maintenance of the environmental, heritage or agricultural values of their land. TDR is based on the concept that with land ownership comes the right of use of land, or development. Therefore, these land-based development rights can in some jurisdictions be used, unused, transferred or sold by the owner of a parcel.

All properties within the Town of Bluffton and under the purview of a development agreement are eligible for and allow TDRs by right within area limits of that development agreement. Article 6.6 of the UDO provides incentives for those properties within the Town of Bluffton and under the purview of a development agreement to develop or redevelop in a manner that is in accordance with the UDO, the Growth Management Framework Map, and the Town of Bluffton Comprehensive Plan. In order to qualify for the incentives as outlined in Article 6.6.4,

development or redevelopment of property that is under the purview of a development agreement in the Town of Bluffton shall utilize the Town of Bluffton's TDR Program and/or transfer of Assignment of Rights and Assumptions within the purview of the respective development agreement to facilitate growth within the respective place type as illustrated on the Growth Framework Map.

The Town has established the Town of Bluffton Development Rights Bank, which can be used to store development rights that have been purchased (PDR) if there is not yet a receiving area development identified. This mechanism is used when the time of the sale in the sending area is not concurrent with a development in the receiving area. It can also be useful in communities that have the opportunity to purchase the rights from an area of high conservation interest but do not have a development that can receive higher density at the time.

- ✓ The Town does not require that developers look for or pursue opportunities for TDR transactions. However, the Town does offer incentives in the form of reduced application fees to those parties who do utilize the TDR Program.
- ✓ The TDR Program also operates similar to a mitigation bank in that a party looking to perform a TDR transaction does not need to own development rights to both the sending and receiving properties. The party could purchase Development Right Units from the Town of Bluffton Development Rights Bank.
- ✓ Property owners can donate Development Right Units to the Town.
- ✓ When the development right is transferred from a developer it can be put into a conservation easement to preserve the natural land cover. However, the Town may find stormwater BMPs that could be implemented on the property that would have a direct improvement on water quality of the May River.
- ✓ TDR is a practice that would help prevent future degradations of the May River. In most cases it is not expected to be able to restore areas that have become degraded due to existing developments.

TDR opportunities will vary from site to site. There can be no broad or general set of guidelines around which the Town could focus incentives or a standard operating procedure. Each TDR project will offer up its own set of unique circumstances that will result in site specific opportunities and incentives that will be reviewed and recognized on a case by case basis.

There may be circumstances in which there is a desire to keep certain properties undeveloped without wanting to transfer their development rights elsewhere, effectively retiring those development rights. In this case there would be a need to negotiate the development rights to those properties. That action would most likely be taken by the Town or a partnership as identified in Section 5.4.

In summary, smart, sustainable, and environmentally conscious growth is critical to maintaining the May River as a natural resource for future generations. Encouragement of continued development within the targeted locations of the Growth Framework Map should be promoted, which in turn will minimize sprawling development. Providing more TDR opportunities could help protect the May River by reducing the amount of impervious area introduced into the watershed, and ensuring that natural ground cover is maintained. It is

suggested that detailed discussions and negotiations would be required to occur with the current stakeholders in order for this to be a successful practice. This action requires complex negotiations and detailed agreements, and the process of this type of action should be started in the near term to ensure success and that coordination is utilized to the fullest.

3.3.4 Land Acquisition Strategy/Condemnation Policy

The Town doesn't currently have a specific land acquisition strategy or condemnation policy. Beaufort County has developed the Rural and Critical Lands Program, which provides insight to this issue. However, this is a secondary element. Therefore, it is recommended the Town develop their own land acquisition strategy for future potential stormwater projects. Items to consider while developing this policy include:

- ✓ There are future projects that will require it. These projects could range from pond modifications, new pond construction, or right-of-way expansion for further stormwater treatment. Therefore, it would serve the Town well to have this policy in place so it could be utilized should it be required.
- ✓ Each project will vary regarding the amount/extent of acquisition required. Various projects will require different access, easements, and ownership, thus dictating specific needs for the project. It is recommended to have maintenance and access agreements in place for various projects, as opposed to implementing actual land acquisition for the project where possible or desirable. This will reduce the overall costs and complexities associated with the projects. For projects that will be a partnership with the public with grant funding, this is needed early in the process to be able to apply for a grant.
- ✓ There is upfront effort required to implement this type of policy, and therefore it is recommended to begin in the short-term. This process begins with coordination with the Town's legal department and assessing similar policies used for eminent domain cases and other projects requiring land acquisition or condemnation. Where projects locations have been identified that clearly show exceptional benefit to the water quality of the May River, all means should be used to gain access to the site, including condemnation. It will also be beneficial to review past public support feedback, and identify which situations seem most and least favorable to the public at this time, then coordinate with the Communications Plan (See Section 4.4 – Timeline of Implementation Schedule). The Town can use the 319 projects as well other defined Town projects as short term opportunities to test the receptiveness of likely stakeholders.

3.3.5 Sewer Policy

Based on AMEC's and the CWP's review of available data, septic systems may be a source of bacteria loading because areas of older developments that have long relied on septic systems appear to have elevated levels of fecal coliform. In addition, Beaufort Jasper Water Sewer Authority data suggests high concentrations of septic systems near the May River. While functioning septic systems remove most bacteria, according to the CWP, septic system failure

rates are typically about 10%, but can be up to 30% if septic systems are placed on areas with a high groundwater table, or on inadequate soils. As more detailed data is obtained through field monitoring, the bacteria contribution of septic systems in this watershed can be presented with greater accuracy and detail. Regardless, it is recognized that septic tanks do have the potential to be a very significant contributor. Consequently, the recommendations included in this action plan focus primarily on actions that are 1) generally good practices that any community should follow, and 2) useful for understanding the scope and severity of the problem.

In order to determine the severity of the problem, as well as the potential interest or opposition to septic program initiatives, The Town and/or County should consider conducting a survey of septic-users in the watershed. This is a fairly simple first step to help craft a larger program. The Sewee to Santee Corridor in rural Charleston County completed a fairly comprehensive study, but one simple component of this was a homeowner survey that helped understand the current state of the practice.

A septic system ordinance is a necessary first step to ensure any long-term maintenance of septic systems. Typically, the ordinance outlines when inspections are required and a timeline for repairs. The South Carolina Department of Health and Environmental Control (SC DHEC) provides some excellent templates that identify several options for ensuring ongoing maintenance and repairs of septic systems. While implementing an ordinance is an immediate recommendation, the Town of Bluffton needs to make some key decisions about the specific structure and options, including:

- ✓ When should inspections and maintenance be required?

  Typically, inspections and maintenance (e.g., pump out of tanks) should be done either on a periodic (3-5 year) basis, or at Time of Sale. At a minimum, the Town of Bluffton should require Time of Sale inspections, and encourage regular maintenance through non-regulatory means. This needs to be investigated further in the implementation phase of this plan. As part of the Town's stormwater ordinance, the Town already requires repairs to systems that are currently causing an active discharge that creates a public health issue.

- ✓ If regular maintenance and inspections are not legally required, how do we encourage ongoing maintenance?

  Inspections are typically paid for by the homeowner, but many communities offer incentives at the time of inspection. The City of Nags Head, NC offers free inspections, and offers a $30 credit for septic tank pumping. Another innovative program (in Skagit County, MI), provides a $100 rebate for septic system inspections, if the homeowner attends a septic training seminar.

- ✓ How should records be maintained?

  A key goal of the septic maintenance program is to better understand the potential contribution of septic systems, by understanding their type and condition. This data should be retained at the Town or County level. The SCDHEC also provides an excellent template for tracking septic systems.

- ✓ If repairs are expensive, who should pay for them?

  Septic repairs can be very expensive, and may create a burden for low- or fixed- income residents of the watershed. Many communities have struggled with this issue and some solutions include: 1) Develop an assistance program for low income residents. This was pursued by Anne Arundel County, MD (a link is provided below). 2) Another option is to offer low or no-interest loans. Nags Head, NC is one community that offers this option.

Some resources that would be beneficial to the Town in reviewing and preparing a Septic Policy are the following:

1) Skagit County Septic System Rebate:
http://www.skagitcounty.net/healthenvironmental/documents/septics101rebate.pdf
2) SCDHEC templates for ordinances and database systems:
http://www.scdhec.gov/health/envhlth/septic/ordinance-templates.htm
http://www.scdhec.gov/health/envhlth/septic/database-template.htm
3) Anne Arundel County (MD) Assistance Program:
http://www.aahealth.org/programs/env-hlth/assist/well-septic-system-program/eligibility
4) Nags Head, NC program description:
http://nagshead.govoffice.com/index.asp?Type=NONE&SEC={F43EBE1E-2B2D-4F36-8182-0544F0BEEAD1}
5) Sewee to Santee program and Survey form:
http://www.scdhec.gov/health/envhlth/septic/sewee-santee-study.htm

Within the Town of Bluffton, certain parties may be better equipped to handle the development of a sewer policy than others. Because Beaufort Jasper Water & Sewer Authority has the ability to provide sanitary service, the potential for partnering with the Town and/or the County exist. Furthermore, there is motivation to develop appropriate incentives for homeowners with septic systems, through the development of a sewer policy that included elements such as regular septic inspection requirements.

At the same time, the Town has secured 319 funding and has begun many of the tasks needed to inspect, maintain and repair septic systems in its jurisdiction. While this is not intended as a program review, it appears that the Town of Bluffton has independently taken a very similar approach to the recommendations in this Action Plan, and therefore the Town should continue pursuing the items outlined with the 319 grant relating to sewer and septic programs. One significant difference is in the order of implementation of the recommended actions. This Action Plan recommends inspections as an early step, followed by a comprehensive education program. The Town held a septic system focus group as a part of a comprehensive Social Marketing campaign as the initial step, and has secured grant funding to pump out and repair septic systems as the follow-up step. As a part of this initiative, Town staff will performing a pre-campaign survey of properties not on sewer, and will be offering free inspections and pump-outs of properties requesting assistance, which explains that order of tasks. It is recommended that the Town consider developing an inspection program concurrently with the education program, because the grant-funded pump-outs and repairs may not be available in the long term, making inspections a necessary component after the 319 Program efforts end. These actions ensure adequate maintenance and inspection of existing septic systems, and help to

ensure that new septic systems are installed properly. By encouraging ongoing inspections, these programs will also help understand to what extent septic systems are a problem in the May River watershed. If the Town can sustain the outreach and pump-out efforts for the long-term, then no changes are recommended.

While some septic system education measures are very simple (e.g., handing out pamphlets) and can be completed along with septic system inspections, other educational messages can be rolled out over time along with a comprehensive education program. This program should respond to needs identified during the initial survey, and can focus on understanding the basics of septic systems, when they should be maintained, and the basics of how to maintain them.

Likewise, a long –term management plan at the Town or watershed level is needed to identify the future strategies for reducing the loads from septic systems. The CWP has determined that loadings from failing septic systems in the May River Watershed could range between $1.7X10^{13}$ and $5.1X10^{13}$ cfu/year. This calculation assumes standard sewer generation rates per household, used in conjunction with the number of parcels on septic within the May River Watershed; and applies a factor for the 10% to 30% failure rate (as described above). This calculation has multiple assumptions associated with it, including the failure rate of septic systems and the locations of these systems in proximity to a shoreline. Therefore, specific data can be obtained from a septic survey, and more detailed loading calculations can be determined for the overall watershed. The recommended initial survey will be a useful first step in developing this plan, combined with failure rate data from initial inspections. Other potential data include existing water monitoring data to identify bacteria "hot spots," stream walks to identify systems discharging to the streams, and a mapping analysis of septic systems along with data such as soils, age of development, and proximity to a waterbody to identify potential septic "hot spots." The survey can be coupled with targeted inspections to confirm problem areas. The plan would analyze these data, combined with known data regarding existing infrastructure and potential future development to determine a long-term strategy for septic system management.

Two actions, including actively replacing (i.e., upgrading) or retiring septic systems (i.e., converting them to public sewer) are longer term, expensive options that would require acquiring more information before understanding their potential and making further recommendations. Installing public sewer may not be feasible for many properties along the May River.

Preparing a sewer ordinance can be a high capital cost commitment, though this cost could potentially be split between the Town and the County. It is recommended that discussions take place in the short to medium term relating to establishing more County sewers in septic areas; however, the immediate focus should remain for the Town to implement the previously suggested septic tank efforts, as discussed further in Section 4.3 – Retrofit Opportunities.

Recommended Actions

In order to reduce water contamination due to septic system loadings, the following items are recommended for implementation:

- ✓ Discuss the preparation of rules and regulations relating to sewer/septic
- ✓ Discuss sewer policies for current septic systems (maintenance and repairs vs. converting to sewer)
- ✓ Conduct a survey of septic-users in the watershed, to evaluate the current conditions of septic and potential to transition septic to sewer. The density of homes in a defined area that are on septic systems, and therefore the sewer generation rate from certain areas, could determine the need for transition from septic to sewer.
- ✓ Develop a long term management plan, which can include inspections/maintenance items, for use in identifying the future strategies to reduce septic loading.

Refer to Map 5 in Appendix D that shows the existing sewer lines, as well as parcels not on sewer, within the Town of Bluffton and the May River Watershed.

3.3.6 Design Storm Recommendations for Development

The Town currently has implemented various stormwater design standards based on specific design storms. For instance, the practice of limiting the post developed runoff volume to the pre-developed runoff volume during the course of a specific design storm, such as the 95% event, manages the volume of stormwater discharge for the site. In addition, requiring the first inch of runoff, or similar water quality event, to be infiltrated reduces the rate of pollutant loading to the May River, while also working to preserve the natural hydrology (volume and peak flow rates) of the River. However, there are additional implementations that the Town can put into practice to further enhance the engineering design standards relating to stormwater treatment and water quality improvement.

One of these alternative design storm standards that can be implemented is designing to the Aquatic Protection standard, as described in the CSS. This standard over detains the more frequent, shorter duration storm events, such as the 1-yr 24-hr storm event, to prevent impacts from freshwater volume downstream. This not only can maintain natural salinity levels in receiving waters by not causing dilution during rain events, but can also decrease stress on channels in upland tributaries due to running at bank-full elevations for extended periods of time. Upland channels running at bank full elevations for extended periods of time can eventually lead to increased sediment loads, which reduce the ability of ponds to kill bacteria through UV rays. When the ponds collect too much sediment, the water becomes cloudy, the volume is reduced and short-circuiting occurs, thus preventing full treatment of the ponds via wet detention.

Another aspect to review when making design storm event regulations is a review of the actual runoff volume being generated for a given storm. Recent studies in Florida (H. Harper, 2011) have revealed that some commonly accepted engineering design standards for predicting runoff are overestimating the actual runoff volumes. Therefore, to get an accurate representation of stormwater runoff and pollutant loading, it is recommended that more detailed watershed monitoring take place. This monitoring will provide rainfall and flow data at various points throughout the watershed during rain events. This should be performed at both developed and

undeveloped areas, and as areas utilizing detention and non-detention techniques. This detailed monitoring data can then be implemented into a watershed water quality model, which will show more accurate loading information throughout the watershed based on site specific runoff information. This data can be used to calibrate/validate the stormwater model that the Town plans to develop in the short-term. This accurate loading information can be used to pinpoint the hot spots and problem areas throughout the watershed with more accuracy, thus providing the Town more specific areas where water quality improvement efforts should be focused.

Recommended Actions

In order to improve the water quality throughout the May River watershed, the following recommended steps can be taken with regards to design storm recommendations:

- ✓ Discuss desire/feasibility for implementing a Aquatic Protection standard, as discussed in the CSS.
- ✓ Perform more detailed monitoring throughout the watershed to determine outflow and rainfall volumes at various locations, to assist in determining actual runoff volumes versus predicted runoff volumes.

3.3.7 Wildlife Management Policy

The review and recommendations for wildlife management policy are variable as there are many unknowns with the wildlife population within the May River Watershed. Therefore, the first recommended action is to obtain a wildlife survey, which will aid in determining what populations exist in the watershed, and where the concentration of the populations is. This will allow for a more specific determination of pollutant loadings from wildlife sources. The survey should be designed for a 12-month period to address various life cycles of wildlife. The survey methods may include trapping and observations as well as interviews with residents. It is recommended that the survey have the goal of determining 4 habitat types on which to focus survey efforts (developed open space-inland, developed-coast, natural open space-woodlands, coastal buffers, or other representative land use types.). This survey will help to establish a (baseline) wildlife contribution of bacteria. Doing so will enable the Town to determine if the current distribution and types of wildlife are in excess of typical populations (and loading rates) for undeveloped areas. Questions that could be answered by this survey include:

- Is there a clustering or concentration of wildlife in a particular area (i.e. riparian buffers), or is it evenly distributed throughout all habitats in the Town?
- Do the numbers of wildlife compare to typical undisturbed areas/natural habitats?

The distribution of wildlife may impact other local policy decisions in terms of habitat and food sources for wildlife, and should be considered before investing with this effort. The SC DNR contact for furbearing wildlife surveys and local wildlife biologist are provided below to help the Town make this decision. The Town of Kiawah Island has a staff biologist (see contact

information below) who conducts regular surveys of a wide range of wildlife and can also be of assistance to the Town of Bluffton in this matter.

Jay Cantrell
Wildlife Biologist
SCDNR Webb Wildlife Center
1282 Webb Ave
Garnett, SC 29922
(803) 625-3569
CantrellJ@dnr.sc.gov

Jim Jordan
Wildlife Biologist
Town of Kiawah Island
21 Beachwalker Drive
Kiawah Island, SC 29455
(843) 768-9166 ext. 405
jjordan@kiawahisland.org

After the wildlife survey is established, the need for further wildlife policy (if any) will be clearer. Loading rates can be determined for the wildlife area using information obtained in the survey, as well as implementing Beaufort County's EMC for fecal loading from Table 3-8 of the Manual for Stormwater Best Management Practices. Likewise, the CWP Watershed Treatment Model uses a loading rate of 1.2×10^{10} cfu/year for a forested landuse. These generic loading rates can be applied to determine a conceptual loading rate generated from the forested land uses, but a wildlife survey is recommended to determine the actual loading rates and to determine the actual sources of the loading rates (coyotes, deer, etc.) so an action plan can be implemented. Using these loading rates and specific wildlife counts from a survey, it can be determined if wildlife is a significant source of fecal loading to the May River. If it is determined that specific wildlife management policy is required, below are recommendations that can be taken for review of current/proposed policy and action items. These items are prioritized in Section 4.4 – Timeline for Implementation Schedule, for short, medium and long-term recommendations:

- ✓ *Wildlife Corridors*. Establishing connected corridors through open space, wetlands and conservation easement areas can provide the opportunity for population distribution.
- ✓ *Expand forested buffers*. While forested buffers may provide food and shelter for wildlife, buffers are the first line of defense to protect water quality. Currently, the Town has adopted a River Protection Overlay District to require 100 to 150 ft minimum riparian or forest buffer ordinance. Selective clearing is allowed along with 7 defined uses within the buffer. Likewise, if buffer widths appear to be adequate, there is still concern with the extent of clearing on individual lots and the impact this has on effectiveness of buffers and wildlife corridors.
- ✓ *Public education campaign to reduce wildlife food sources in developed areas.* Signs posted in public areas 'do not feed wildlife'; flyers in water bills or other local mailers will remind homeowners of proper and secure waste disposal practices.

- ✓ *Physical barriers to wildlife.* Should physical barriers, such as fences, be implemented in certain areas of the watershed and along streams/conveyance sources, to limit the fecal loading being conveyed to the May River.
- ✓ *Individual homeowner BMPs.* Individual residents can be made aware of specific non-invasive actions they can take to reduce wildlife species in their neighborhood, and improve the water quality of the adjacent May River. Likewise, consider providing information on town website about creating backyard wildlife habitat for a positive spin on wildlife as a companion program with other measures to control wildlife considered a nuisance.
- ✓ *Horse manure management & BMPs.* Direct management of horse manure can directly and significantly increase the water quality of a watershed.
- ✓ *Hunting/culling.* It is cautioned that there are dangers associated with hunting in populated areas (i.e. injuries to citizens from missed shots, or other methods), should this method be considered.
- ✓ *Re-introduction of predators of problem species.* Caution is advised on the type of predator species, given planned growth in the area/human population and risks to human safety that may incur as a result. Also, it is difficult to create a balanced predator-prey ratio, which introduces the risk of causing more ecological problems in the future based on the predator species introduced.

Recommended Actions

There are many unknowns when it comes to the wildlife population and loading throughout the May River watershed. However, in order to accurately assess the situation and determine the loadings from the wildlife population, the following items are recommended:

- ✓ Perform a wildlife survey to determine the count/species of deer, hogs, raccoons and coyotes within the watershed.
- ✓ Use the determined EMCs and loading information to obtain specific loading rates/concentrations throughout various portions of the watershed. Use this for determination of problem areas/sources. If wildlife indeed is a significant loading source, below are additional steps that can be taken:
    - *Establish Wildlife Corridors.*
    - *Expand forested buffers.*
    - *Public education campaign to reduce wildlife food sources in developed areas.*
    - *Physical barriers to wildlife.*
    - *Individual homeowner BMPs.*
    - *Horse manure management & BMPs.*
    - *Hunting/culling.*
    - *Re-introduction of predators of problem species.*
    - *Promote purchase and transfer of development rights in sensitive areas.*

3.4 Watershed Inventory

An inventory and analysis of drainage areas within the May River Watershed is a necessary part of a strong action plan. This section of the plan sets out to clearly describe the needed elements and purpose for a complete watershed inventory. This started with defining and analyzing the sub-drainage basins within the watershed so that findings can be correlated to specific areas. The May River Watershed Drainage Maps and Watershed Analysis will demonstrate the spatial relationship of certain land uses within the watershed so that the catalog of ideas for improvement may be understood from the context of place-based solutions.

As a result of the eventual Watershed inventory elements, proposed solutions may then be analyzed and understood as an interconnected system as opposed to single basin or project.

Policy recommendations, such as declaring sensitive areas, can be analyzed for long-term effects on the entire watershed, and not be limited to the immediate effects in a particular area. To date, the first two elements below are in progress (Section 3.4.1 – Delineate May River Watershed and Section 3.4.2 – Impervious Surface Map) , and the purpose of the remaining two deliverables (Section 3.4.3 – Watershed Analysis) has been expanded upon.

3.4.1 Delineate May River Watershed

To fully address the problem of rising fecal coliform levels within the May River Watershed, an understanding of the drainage network flowing to the May River must be achieved. Without this understanding, identifying problems, cause and effect relationships, and potential solutions is all but impossible. The complete delineation analysis is in progress, and below is a summary of steps taken to determine the May River Watershed.

Delineating the May River Watershed into many smaller sub-basins and identifying flow paths from other sub-basins will form the beginning of a drainage and pollutant transport model that will allow various scenarios to be tested prior to implementation. This drainage / pollutant transport model will allow the effectiveness of each individual scenario on the entire watershed to be explored prior to implementation as well as identifying and predicting the unintended side effects of implementation on the sub-basin and watershed level. This delineation will lead to the determination of the interconnectivity flow paths between sub-basins. Such information can then be used to set up a hydraulic routing model throughout the watershed, if desired.

The following items summarize immediate implementation strategies, most of which have already been completed, as well as recommended long term implementation strategies.

Immediate Implementation Strategies

Phase 1: The first phase of the project identified and cataloged all existing development plans within the May River Watershed. These development plans typically show pre-development and post-development drainage basins and flow paths. This method was not applicable to areas that were not part of a planned development such as the Old Town Historic District of Bluffton or areas along the May River and in the County that were developed many years ago. This method also was not applicable to undeveloped areas as development plans for these areas have not been submitted yet.

Phase 2: The second phase of the project used LiDAR to determine flow paths and sub-basin boundaries. Using elevation data from LiDAR and engineering experience and judgment, sub-basins and flow paths were created. This was used mostly in undeveloped areas and wetlands where development had not influenced drainage patterns. Generally, using LiDAR was very effective in areas that were known to be undisturbed or in areas such as wetlands that had a high likelihood of not being disturbed. This phase is currently ongoing.

Phase 3: The final phase in the project includes obtaining field data and local knowledge. The process generally involves field verification of the assumptions made in the previous two phases. Additionally, areas where the previous two phases were unable to determine flow paths and / or sub-basins would be determined in this phase.

The three phases described above will ultimately be used to digitally create a flow network that defined sub-basins and the interconnectivity between each basin. The determined areas of each sub-basin, in conjunction with the associated landuse, is required to generate an estimated runoff volume, loading and duration in the drainage / pollutant transport model. The delineation of the May River drainage basin has been completed, while the delineation of the sub-basins and the associated flow paths between drainage basins are currently in progress. The overall May River drainage basin is shown on Map 1 in Appendix D.

Long Term Implementation Strategies

No long-term implementation strategies are required as this deliverable will serve to build the foundation for the Stormwater Drainage as well as a Pollutant Transport Model. However, as new development occurs and drainage patterns are altered or better understood, information must be incorporated into the stormwater drainage and pollutant transport model(s). As information is received, it should be used to update and supplement the Stormwater Drainage and Pollutant Transport Model, which, in turn, will further the understanding of the May River Watershed. New development drainage and pollutant transport models should be required to plug their development models into the existing model to ensure no impacts outside of the proposed development will occur. This process will continue to update the current conditions of the watershed and ensure no adverse impacts.

3.4.2 Impervious Surface Map (current and projected)

The amount of impervious surface within a watershed affects the water quality within a watershed, if not properly controlled. Previous studies have shown a direct link between water quality and impervious surface (Holland, et.al. 2004). Specifically, an increase in impervious surface with inadequately controlled stormwater will produce a negative effect on the water quality and health of a watershed.

Impervious surface maps serve as a tool for planning, giving planners and elected officials the capacity to visually observe geo-political areas of impervious percentages and plan growth and economic development from a watershed standpoint.

Bluffton has grown from 1 square mile to about 54 square miles in total area. Although much of the new Town limit is undeveloped at this time, the amount of impervious area has increased significantly and will continue to increase as land use continues to be converted from undeveloped land to developed land.

The Town of Bluffton and Applied Technology & Management (ATM) completed an impervious study of the May River Watershed, as well as the jurisdictional boundary of the Town of Bluffton, in April 2010 in the form of maps and GIS files.

By determining the current impervious area, the Town will be able to know the specific percent of the watershed that is currently impervious, and can use that data when making new ordinances and regulations to manage the watershed appropriately, in its current condition as well as with future growth projections.

Impervious features were digitized from 2009 natural color orthographic imagery provided by Beaufort County, using AutoCAD Civil 3d 2009 and ArcView 9.3. The Feature data digitized in CAD was imported into an ArcView GIS feature dataset and cleaned to remove overshoots and "sliver" polygons. All GIS feature datasets created for this project are in the NAD 1983 State Plane South Carolina FIPS 3900 (Feet) coordinate system. Impervious feature types are listed below. All other features were considered pervious. For a supporting documentation from the report, see Appendix A.

Table 3-4: Summary of Impervious Study Results

Feature	Feature Count (Quantity of each)
Buildings	7,683
Driveways	6,517
Extra Structures	4,057
Parking Lots	240
Driveway/Parking	20
Unknown	96
Roadways	955 ≈ 41 features digitized from 2009 ortho imagery ≈ 19 features using offset from TIGER road shapefile ≈ 895 features using offset from Bluffton street shapefile and adjusted at major intersections and within some subdivisions *Note: water features are not included

Town of Bluffton Only:

Impervious	1,531 ac	4.4%
Pervious	32,926 ac	95.6%
Total	34,457 ac	100%

Unincorporated Areas Only:

Impervious	444 ac	8.1%
Pervious	5,059 ac	91.9%
Total	5,503 ac	100%

Total Area (Town of Bluffton and Unincorporated Areas)*:

Impervious	1,975 ac	4.9%
Pervious	37,985 ac	96.1%
Total	39,960 ac	100%

*Within the Town boundary are pockets of unincorporated County lands.

The May River watershed within the Town of Bluffton is approximately 13,477 acres (approximately 39% of the entire Town of Bluffton area). There are other basin studies that vary slightly from that amount, but they are close. The Okatie River/Colleton river watershed to the north of the May River watersheds has approximately 3,751 acres within the Town of Bluffton jurisdiction (approximately 11% of the entire Town of Bluffton area). The New River/Cooper

River watershed to the south of the May River watershed has approximately 17,482 acres within the Town of Bluffton jurisdiction (approximately 51% of the entire Town of Bluffton area).

Implementation Strategies

The impervious surface study is an ongoing analysis. While the data collected is useful in its current form, we recommend that further delineations be made to identify potential increases of impervious surfaces within the sub-watersheds. Further, as the town continues to develop, this data should be updated to reflect current conditions.

3.4.3 Watershed Analysis

The Town does not have pollutant transport or hydrologic/hydraulic models that can be used for this Action Plan. The previous watershed delineation and impervious surface map tasks, which have been developed, can now be leveraged to perform watershed analyses. Such analyses can take the form of simple wash-off modeling that use spreadsheets, to estimate relative pollutant loading from various land uses, and potential reductions from BMPs. They can also take the form of more-complex hydrodynamic modeling that address not just pollutant loading and BMP removal rates, but also look at event-mean concentrations, taking into account runoff volumes and pollutant fate and transport mechanisms.

Modeling provides technically-based predictions of pollutant loadings under different scenarios. Such scenarios can include natural versus post-development conditions, comparisons among different post-development land uses, and changes in pollutant loadings after potential improvements are made (both structural and non-structural BMPs). Developing predictive models can be done with a variety of tools and data sets, and for varying levels of precision. The selected method(s) will be based on the available data and the anticipated use.

It is recommended that the Town develop a detailed scope to determine the type of numerical modeling that would be most useful for prioritizing projects and for assessing their anticipated improvements to the May River. The types of models used can change over time as this Action Plan is further developed. However, the types of data to be used and the purpose of the model should remain consistent. For example, determining if TSS and nutrient loading rates are also of concern (in addition to fecal coliform bacteria) will be important. Likewise, determining the modeling inputs required – such as runoff coefficients (which reflect land uses and soils), imperviousness and soils, will also be important.

Specific loading information can also be determined for septic and wildlife loads within the watershed by obtaining more detailed information and applying it to a specific watershed model to determine potential problem areas. The modeling can begin with a spreadsheet model that utilizes GIS data (soil, delineation, land use, etc.), which can be developed into a network model (ICPR, SWMM, etc.) at a later date without significant redundant efforts.

It is suggested that the Town begin with simple wash-off models to look for trends that will help to identify sensitive areas, which may require special structural or non-structural measures, significant capital, or stakeholder support to implement. It is also recommended that the Town develop a spreadsheet modeling approach for relative pollutant loads under a variety of scenarios (natural, current, future land uses, etc.). This approach should utilize available GIS data and the data that the development community can most easily provide when performing analyses for their projects (drainage areas, imperviousness, soils information, BMP type/size/location). This can be done by either requiring the development community to use a model for stormwater management facility sizing (ponds and pipes) that is suitable for watershed-scale analyses (i.e. HEC-HMS/RAS, SWMM or ICPR). The other option is to require the development community to provide the basic data for their site in a format that the Town can most-easily input into a watershed-scale model (simple databases or spreadsheets).

This approach will offer an analysis tool that will provide further support for the types and locations of proposed projects to be implemented. It can also support prioritization for scheduling and funding purposes. This would also include a technically-based, relative performance of multiple project concepts (i.e. "Did things get better or worse?" "…to what degree?"), which can be used for a formal cost-benefit assessment.

The long-term modeling approach should include dynamic modeling that can be calibrated to the water quality monitoring stations in the May River. This would offer a watershed-based assessment of the May River's health, the impacts (positive and negative) of the activities within the watershed, and will help with the decisions of where to commit Town resources.

4.0 Assessment and Implementation

This section summarizes the existing monitoring program, focuses on identifying existing hot spots within the May River Watershed, as well as identifies opportunities for targeted retrofits to allow for the most efficient and economical projects to be identified and selected for repair, restoration, or reconditioning. This section also provides a basis and framework for more extensive projects that may be more complex. Lessons learned here will prove beneficial for future endeavors.

4.1 May River Watershed Indicators

An inventory of watershed indicators, defined by sub-drainage basins and based on testing and sampling efforts, is needed to more specifically catalog the May River. That effort will include both historic and future direct additional management efforts for the May River. Understanding this inventory will help to better correlate targeted watershed retrofits and other improvements as well as provide a measure of success for improvements. Enabling the public access to data will promote education concerning the watershed and possibly generate previously unknown

ideas on ways to better the May River Watershed. Once key parameters are determined and catalogued, a model can be developed to understand the roles the parameters play in the watershed. Ideally, this model could be used in concert with the hydraulic and hydrological model to be developed.

For many years, technical staff has been researching the many parameters that are assessed as part of an evaluation of environmental health. Correlation of findings will allow for an identification and review of both physical and procedural retrofit options. A County study on water budget changes in partnership with Clemson University will add hydrology impacts in basin.

4.2 May River Water Quality Monitoring Program

The Fiscal Year 2012 proposed monitoring program was recommended to the Town of Bluffton in the "Water Quality Concerns in the May River: Analysis of Monitoring Data Collected by the Town of Bluffton and the Palmetto Bluff Development" 2010 report by the Marine Resources Research Institute of the South Carolina Department of Natural Resources (SCDNR). A summary of the SCDNR Report and recommended actions is discussed in Section 4.2.1. The Town of Bluffton will be following these procedures starting in Fiscal Year 2012.

4.2.1 May River Water Quality Trend Analysis

Much of the concern related to water quality in the May River centers around fecal coliform bacteria concentrations, several data sets were carefully evaluated to address this issue. Analysis of those data indicates that, as a whole, the May River has been experiencing an increase in fecal coliform bacteria concentrations since the mid to late 1990's. The SCDHEC station (19-19) located farthest upriver increased significantly over time with a geometric mean fecal coliform levels of 30.3 colonies/100ml in 2008, which was much higher than in preceding years. Additionally, the incidence of fecal coliform levels above 43 colonies/100ml increased during the 2004-2008 time period. These levels exceed allowable levels for shellfish harvesting.

The higher and more rapidly increasing fecal coliform levels in the upper portion of the May River, as compared to the lower portions, likely reflect a combination of water body size and flushing rate, as well as development trends in the different May River watersheds. The upper and middle sections of the May River experience less flushing and more freshwater input relative to the size of the river than the lower portion, which also has higher salinity water. Fecal coliform bacteria levels were significantly and inversely related to salinity at almost every station. Rapid development in the upper section of the river is also likely to be playing a role in the changing conditions in the middle section of the river.

Relative to similarly sized effluent-free water bodies in Beaufort County, most of the May River does not appear to be degraded with respect to fecal coliform bacteria. However, the degradation of the upper portion of the May River may extend into other sections of the river if recent trends continue and efforts are not made to eliminate or reduce the sources of these bacteria.

In-stream fecal coliform levels are closely but not entirely related to rainfall patterns in the southern portion of the state. Discrete increases in fecal coliform levels were sometimes quite consistent among stations suggesting a common driving cause. The influence of rainfall was also clearly reflected in the low fecal coliform levels recorded at all DHEC Shellfish stations from 1999 through 2001, a period when rainfall levels were at their lowest in the southern portion of South Carolina. Increases in fecal coliform levels in recent years occurred during a period of decreasing rainfall and increasing salinities. This suggests either that there has been an increase the sources of fecal coliforms (wildlife, domestic animals, etc.) rather than an increase in total runoff volume or that runoff has become more episodic.

The main stem data set collected by Palmetto Bluff documented no significant temporal trends in fecal coliform levels, but generally confirmed the broader spatial patterns documented by the SCDHEC shellfish data set. The station located farthest upstream (M4) had the highest average fecal coliform levels and these levels decreased farther downstream.

4.2.1.1 DNR Recommended Sampling Stations and Map

Monitoring within the main stem of the May River, and not just in creeks and drainages, should be continued. Sampling the main part of the river is critical because it is 1) the location of the primary resources of concern, and 2) the water body upon which state management decisions are based. Monitoring of headwater creeks and drainages provides a useful early warning system for changes occurring within local subwatersheds, but unusually high values observed for water quality parameters may not result in high levels of those parameters farther downstream in a creek or in the main stem of the river. Main stem monitoring is currently ongoing, and steps to expand to complement existing state monitoring data and to link water quality in headwater creeks to that in the May River more directly have been taken. These sampling points were relocated to better represent the length of the river and for better integration with the existing SCDHEC stations.

Data sondes recording continuous water quality data in the main stem of the river have provided a detailed measure of physical and environmental variability. However, this type of data collection is very expensive to conduct and management decisions are difficult to make since the data are not consistent with SCDHEC methodology. If such an effort is continued, subsets of the continuous water quality data provide an accurate estimate of monthly averages and monthly variability within the data set as a whole. The middle five days of each month appear to provide the best relationship to total month averages. The value of continued collection of these data for future management decisions is not clear. If this effort is continued, these goals should be more

clearly stated. If it is determined that additional continuous data are not needed in the future, these efforts and funds should be re-allocated to implement a monitoring program that includes other water quality parameters that are of direct concern and is consistent with SCDHEC methodology.

The current sampling locations are shown on Map 6 in Appendix D.

4.2.1.2 DNR Recommended Parameters

It has been recommended that the sampling sites monitor critical parameters (fecal coliform bacteria, TN, TP, turbidity) and basic water quality parameters in the headwaters/drainages of developed subwatersheds in both Palmetto Bluff and Bluffton: Stoney Creek, Rose Dhu, Verdier Cove, Heyward Cove at Bluffton Village, Palmetto Bluff Creek (stations 1), and Palmetto Bluff Phase I stations 1, 2, and 6. Likewise, these same parameters should be monitored in Palmetto Bluff drainages from three impoundment/pond systems, including Phase I stations 3 and 4 and one additional pond system (to be determined).

4.2.1.3 DNR Recommended Sampling Regimen

Main Stem Monitoring Efforts: Monitoring within the main stem of the May River, and not just in creeks and drainages, should be continued. The main stem monitoring should be continued and expanded to complement existing state monitoring data and to link water quality in headwater creeks to that in the May River more directly. Relocating them to better represent the length of the river and for better integration with the existing SCDHEC station is also recommended. If it is determined that additional continuous data are not needed in the future efforts and funds should be re-allocated for implementation of a monitoring program that includes other water quality parameters that are of direct concern and is consistent with SCDHEC methodology. The volunteer monitoring network collected data that was consistent with other data sources, but, if continued, the network should be utilized to assist with a more coordinated sampling effort and focus on water quality parameters of greatest concern.

Upland drainage Monitoring Efforts: The Phase I and II drainage data collected by the Palmetto Bluff Development provided useful information on inputs to the May River from both developed and undeveloped sub-watersheds. Continuing this type of monitoring would be useful, but the effort could be reduced and streamlined, and methodological issues associated with the past sampling effort could be improved.

The Palmetto Bluff golf course data provided good information on levels of fecal coliform and nutrients in the golf course cistern and adjacent Palmetto Bluff creek that leads to the May River. Based on the findings, continued sampling of this system is not necessary, with the exception of maintaining a station in the headwaters and near the mouth of the creek as part of

an improved overall monitoring effort of the sub-watershed drainages flowing into the May River.

The Bluffton rain event data provided useful information on potential inputs to the May River from the Town of Bluffton, but several limitations need to be addressed in future efforts. While the headwater creek sampling provides useful sentinel data for potential changes in pollutant levels, their link to management decisions must be better established. Sampling at the confluence of the same drainages with the May River (i.e. mouth of the creeks) concurrently with the headwaters would also be useful to understand potential loading of contaminants from these creeks.

As part of a longer-term monitoring strategy for the May River, recommendations included a more coordinated effort that builds on existing programs and includes monitoring in the main stem of the May River and in targeted creek systems in a coordinated effort between the Town of Bluffton and other adjacent jurisdictions. Specific recommendations include:

- ✓ Discontinue the existing continuous data sonde program and collect this type of data only as needed for specific targeted studies,
- ✓ Continue to collect data routinely at main stem river stations, but reposition those stations,
- ✓ Monitor the most critical parameters (fecal coliform bacteria, TN,TP, turbidity) and basic water quality measures in the headwaters/drainages of developed sub-watersheds in both Palmetto Bluff and Bluffton,
- ✓ Monitor drainages from at least three undeveloped drainages on Palmetto Bluff,
- ✓ Discontinue monitoring at most Palmetto Bluff Golf Course stations,
- ✓ Sample headwater and creek mouths routinely as well as following rain events,
- ✓ Improve quality assurance/quality control and consistency of sample and data collection among Bluffton, Palmetto Bluff and state monitoring programs,
- ✓ Structure future monitoring efforts or research around clear and focused questions.

4.2.2 Hot Spot Identification and Targeted Retrofits

This section provides locations of high fecal loadings, aka hot spots, as well as the sources behind the loadings with recommendations to control the fecal loading in these areas for enhancement of overall May River Watershed water quality.

4.2.2.1 Hot Spot Identification Map

The Town of Bluffton and Beaufort County have been implementing a weekly sampling program, and obtaining weekly readings from various sampling points throughout the May River Watershed. This sampling program and implementation is described in detail in Section 4.2.1 - May River Water Quality Trend Analysis, through Section 4.2.1.3 - DNR Recommended

Sampling Regimen. Monitoring data from this sampling effort has indicated specific areas that have had observed higher levels of fecal coliform concentrations compared to seasonal patterns. These areas have been termed as hot spots, and are the focus areas for future project recommendations. The hot spot areas are detailed in Section 4.2.2.2 - Hot Spot Attributes, including a summary of typical and recent monitoring data results.

For the May River watershed as a whole, higher pollutant load rates and concentrations of fecal coliform have been identified in the headwaters of the May River, as compared to the main stem of the river. Hot spots in upland drainage areas contribute to the high levels of fecal coliform in the headwaters. Hot spots in the headwaters of the May River are depicted on the below map The map should continue to be updated by the Town and County with current monitoring data results. The map and monitoring results should be used to identify trends for potential pollutant sources, identify target areas for future BMP projects, and evaluate effectiveness of implemented BMPs. It is important to note that this map shows fecal concentrations in small creeks and drainages that eventually flow to the May River. The normal background fecal concentrations for each site are unique and unknown.

4.2.2.2 Hot Spot Attributes

General conclusions about potential pollutant sources and types of hot spot areas were developed based on the hot spot identification maps, which are based on the County and Town weekly sampling results. Monthly updates of these weekly sampling efforts are available at http://www.townofbluffton.sc.gov/mayriver/. Results from March 2009 through February 2011 were evaluated for this Plan.

Station HH-6 south of Hampton Hall returned the highest fecal counts of the sampling stations according to recent sampling information, from the period of November 2010 through February 2011, recording an average of 1700 cfu/100 ml. However, this data is limited data generated from one recent season including 15 samples.

The highest consistent fecal coliform counts (cfu/100 ml) were found throughout the vicinity of Gascoigne Bluff and Stoney Creek. Stations SC-3 and SC-12 within Gascoigne Bluff had a history of high fecal counts, with monitoring data from the period of Summer 2009 through the Winter of 2010 averaging around 1600 cfu/100 ml and 1160 cfu/100 ml respectively. Yet, recent monitoring data (Spring/Summer 2011) has averaged less than 100 cfu/ 100 ml. Likewise, Station SC-3A in this same area has a history of having fecal coliform within the range of 400 cfu/100ml to 2400 cfu/100 ml. Therefore, all monitoring stations in this area return samples consistently over 400 cfu/100. The Stoney Creek area has four monitoring stations in the vicinity, all of which have consistent trends of exceeding 400 cfu/100 ml fecal coliform counts. These stations, SC-4, SC-10, MRR-10, and SC-5, have recent monitoring station data averaging between 1270 cfu/100 ml and 630 cfu/100 ml during a period of Summer 2009 through the Winter of 2010.

The next highest loading area is the area southwest of Hampton Hall. This area has two sampling points located in the vicinity, RDCP-5 and RDCP-4. RDCP-5 is generally higher than RDCP-4, averaging over 2400 cfu/100 ml where RDCP-4 is generally between 400 cfu/100 ml and 2400 cfu/100 ml. For example, during the recent sampling events from March 2009 through February 2011, station RDCP-4 averaged a fecal coliform count of 742 cfu/100 ml. The RDCP-5 drainage was retrofitted with rock-check dams as a result of these data.

The area south of Hampton Lake has two sampling points, HL-11 and SC-1, which typically average between 400 cfu/100 ml and 2400 cfu/100 ml. In the recent sampling data from March 2009 through February 2011, station SC-1 averaged 1205 cfu/100 ml, while station HL-11 averaged 775 cfu/100 ml.

The area east of Palmetto Bluff also returned high fecal coliform counts throughout the four sampling points in this area, BECY-1.5, PBR-9, PBP-8, and SC-13. The highest of these sampling points is generally station PBR-9, which averages between 400 cfu/100 ml and 2400 cfu/100 ml. The recent sampling data from March 2009 through November 2010 show this station averaging approximately 994 cfu/100 ml. The lowest of these four stations is SC-13, which typically averages under 400 cfu/100 ml. SC-13 represents the sampling station in the main May River. In the recent sampling data, this station averaged approximately172 cfu/100 ml between July 2009 and February 2011.

Conclusions

Other pollutant sources will be considered, but based on currently available monitoring data, the following pollutant sources will be emphasized during Action Plan development:

1. **Septic** – Observed fecal levels are higher in older, more developed areas where septic systems are predominant and more likely to be failing.
2. **Wildlife** – Higher fecal coliform concentrations were observed in undeveloped watersheds where wildlife is suspected to be more concentrated as a result of development, usually in buffer areas located in close proximity to waterbodies. Local changes, particularly landscaping practices for housing developments and golf courses, may also be providing an additional food source for wildlife allowing wildlife populations in the concentrated areas to thrive.
3. **Stormwater run-off resulting from altered hydrology from development** (e.g. imperviousness, ditching) – Higher fecal coliform loading rates have been observed in sub-watersheds that have been heavily developed with imperviousness ranging from approximately 19% to 33%. Watersheds with impervious cover levels on the order of 10% to 20% have been documented to show related impairments to watershed health (Holland et. al 2004).
    a. Altered hydrology can contribute to higher run-off volumes which, in turn can result in higher pollutant loading rates. If pollutant concentrations remain constant (i.e. no additional sources from development), altered hydrology can also lead to stormwater pollutants being delivered to waterbodies more quickly and for more prolonged periods. That change in the transport of pollutants can

increase the annual loading rate, and can also affect the receiving water's natural ability to treat the pollutants (i.e. reduced residence time and diminished UV benefits).

b. Altered hydrology can also increases the wash-off of other pollutants like sediment, which can also affect fecal coliform bacteria levels. Sediment that has been in contact with bacteria can harbor and transport those bacteria to other waterbodies. By making water cloudier, sediment can also hinder the ability of the sun's ultraviolet rays to penetrate surface waters and naturally kill bacteria.

4.2.2.3 Matrix of Types of Targeted Project/Retrofit Options

Based on the hot spot identification map and attributes described in the preceding sections, a strategic plan for the types of targeted retrofit options to address these hot spots has been developed. The attributes and the map of targeted retrofit options from the preceding section will be used to identify specific projects, locations, and implementation schedules which are discussed in Section 4.3 – Retrofit Opportunities).

A brief summary of each project type listed in the following matrices is provided below:

- ✓ Septic/Sewer/Reuse Programs/Projects
  - ❖ This is currently being addressed through the 319 projects, and an independent assessment of this concept has shown that it is a worthwhile program to address this point-source which is located along the waterways.
  - ❖ This can be considered a public or a public-private enterprise, based on the cooperation, but it will require homeowner activity and Town /County enforcement.
  - ❖ Future efforts may be able to utilize a new tool developed by Florida State University (FSU) and Florida Department of Environmental Protection (FDEP) that is expected to be released for public use in the summer of 2011. This tool uses GIS information (topography, parcel locations, soils) to estimate pollutant plumes from septic tanks. This allows for the prioritization of neighborhoods for inspection based on their potential to affect nearby waterways.
- ✓ Wildlife Programs/Projects
  - ❖ This source is one that should be considered part of the baseline of pollutant loading, but is more difficult to measure due to the location and mobility of wildlife. It is suspected that the wildlife source is deer, feral pigs and small mammals (i.e. raccoon, etc.) based on local observations.
  - ❖ The source problem does not include waterfowl, as flocks that stay for a portion of the winter do not reside in Bluffton for extended periods. Sizeable populations of local (non-migratory) waterfowl such as Canada Geese typically are the main source of waterfowl fecal coliform. Resident waterfowl are not common in the Bluffton area (based upon local knowledge and observation). However, the 319 program will be addressing roosting birds on docks.

- ❖ Culling is one method that may be needed, however more measurable information from a wildlife survey is recommended before pursuing such actions.
- ❖ The efforts of a local community (Kiawah Island) similar to the Town of Bluffton have addressed this issue and can be investigated. The Town of Kiawah Island has a staff biologist who conducts regular surveys of a wide range of wildlife. This is discussed further in Section 3.3.7 - Wildlife Management Policy.

✓ Stormwater BMPs to address runoff from altered hydrology
- ❖ Structural BMPs, specifically retrofitted ponds or modified ditches, are intended to address impacts from the existing development. They are not intended to offset impacts from pending PUD projects. In some cases these structural remedies are intended to filter pollutants, including sediment which can carry bacteria. In other cases, while these BMPs cannot significantly reduce the current post-development runoff volumes, the extended detention times that they offer have been shown to mitigate the initial impacts. Runoff volume reduction is addressed through other means; most notably site planning tactics that include reduced disturbance and imperviousness, as well as increased infiltration opportunities.
- ❖ This focuses on how flood control and general drainage features may be affecting water quality. An example includes deep excavation of ponds that intercept the water table and add a baseflow that promotes flushing of bacteria from ponds. This can reduce residence time, in turn hindering the natural processes that can remove bacteria from the ponds (see Georgetown County, SC 319 Project; SCDHEC & AMEC, 2010).
- ❖ Likewise, reducing the amount of sediment reaching a pond can increase or maintain the natural processes in the pond (ultraviolet rays).

✓ Agricultural Programs/Projects
- ❖ These are limited in their application within the May River Watershed, however, they can increase water quality awareness, as well as improve operations, to maintain the rural nature of portions of the watershed which will translate to a higher quality of life. Simple examples would be to encourage land conservation plans that can be funded through DHEC/EPA EQIP grants, as well as promote composting and provide education regarding improved composting methods for livestock. These actions reduce the amount of bacteria originated from these land uses, thus reducing the volume of bacteria transported to waterways. Lexington County, SC Hollow Creek watershed 319 Grant Project; SCDHEC & AMEC, 2011 is an example of a project implemented with these types of actions and awareness.

✓ Pet Waste Programs
- ❖ This is a non point-source that the community has significant control over. In addition to being a water quality protection/improvement tool, it is also a quality of life issue. This affirms the importance of this part of the 319 project that is currently underway. While the magnitude of the load to the watershed from this source has not been

fully quantified, it does bring about the awareness needed to gain support for these programs and projects.

- ✓ Runoff Reduction
  - ❖ Reduced pollutant loading can be obtained by providing appropriate retention/detention for runoff, or by reducing the overall volume of runoff. These goals can be achieved through:
    - Reduced clearing, and maintaining of the native vegetation and forested buffers along riparian areas.
    - Minimizing impervious areas by adopting revised zoning and development standards.
    - Promoting increased overland flow to reduce the runoff that must be treated by the stormwater system.
    - Using reduced runoff volumes and peak runoff rates to increase residence times for smaller water quality events.
    - Promoting design for alternative design storms, such as implementing the aquatic preserve standard, which over-detains smaller storm events such as the 1-year 24-hour storm event. This practice avoids salinity decreases due to dilution, reduces channel erosion, and maintains the ability of ponds to kill bacteria via UV rays by reducing turbidity and increasing residence time.
    - Enforcing the Town's stormwater ordinances that require development to control and infiltrate the first one inch of stormwater runoff from the entire development or maintain the pre-development hydrology of the property for the Water Quality Design Storm Event, whichever is greater.
    - Expand the Town policies that support an overall goal of water quality improvement to include runoff reduction techniques such as reduced land clearing, increased pervious area, increased overland flows, and increased infiltration.
    - Expand the Town's stormwater design standards to include further types of innovative BMP technologies in the Stormwater Manual's Appendix A, which will further reduce runoff. These can include practices such as rainwater harvesting, depressional medians for additional detention, treatment trains, bioretention areas, designing to minimum pavement widths, and vegetated filter strips, which reduce the overall runoff volumes for the watershed.
    - Transfer and purchase of development rights, which can minimize impervious areas and maintain forested buffers in environmentally sensitive areas.
    - Stormwater harvesting. This will capture the runoff prior to being discharged offsite, and allow for this volume to be utilized as an irrigation source onsite, which also promotes water conservation.
  - ❖ For existing development (or redevelopment), reducing run off may be more challenging – but the impacts of that additional runoff can be reduced through other improvements, such as:
    - Roadway projects that have medians can be used to draw and treat portions of runoff that have the greatest potential to convey pollutants to the May River.

- Recreational facilities often have impervious surfaces (parking, rooftops), that can be mitigated with alternative surfaces and infiltration features. Such projects can become part of the outreach campaign.
- Typical redevelopment, or the upkeep of existing development, can provide opportunities to reduce the amount of imperviousness and run off volumes associated with the parcel. Although they are not likely to meet the standards for new development, they offer an economical way to reduce replacement and operations costs. Specific examples include: implementing spread pavers that have been designed and constructed to have an increased service life and lower life-cycle cost; disconnecting downspouts and promoting sheet flow that waters landscaped areas.

✓ Education Programs
- ❖ Education is the activity that supports all elements provided in this Action Plan, and can have a continuous future effect on the water quality of the May River. Education and social marketing can be targeted at citizens, developers for private implementation, as well as administrators for policy making.

✓ Ordinance
- ❖ This is required to support changes and recommendations associated with this Action Plan. The ordinance behind the action is necessary to implement new policies that are in line with recommendations presented here.
- ❖ The current ordinances have valuable information and regulations. The Town is currently updating their Unified Development Ordinance, and can use that opportunity to include further updates to the code. Items that can be included are as follow:
  - Continue to create ordinances that promote perviousness and less runoff (i.e. permeable pavement, landscape islands, buffers, etc.)
  - Correlate DHEC design standards for septic systems to water quality and stormwater requirements (i.e. if older septic systems prior to current DHEC design standards, can upgrade the septic system to appropriate design standards. However, if septic systems were designed to current standards and the area is still a problem need to consider switching septic to sanitary sewer)
  - Implement on-lot LID practices for new residential development.
  - Implement a tracking system to track effectiveness and implementation of on-site LID practices during the annual BMP inspections.
  - Define the Town's role in BMP and Septic inspections, and authority for code enforcement.
  - Expand the types of innovative LID BMPs in the Stormwater Manual Appendix A to include additional stormwater BMPs, including various structural BMPs, as well as expanding discussion on the current listed innovative LID BMPs, such as rainwater harvesting.
  - Provide incentives for private improvements that are in line with recommendations in this action plan.

- ✓ Incentives
  - ❖ In order to more widely promote the use of various recommendations presented in this Action Plan, incentives should be implemented to encourage participation.
  - ❖ Transfer of development rights incentives as described in Section 3.3.3.
- ✓ Land Acquisition
  - ❖ The Town should implement a land acquisition policy because future projects will require it.
  - ❖ There is upfront effort required to implement this type of policy, and therefore it is recommended to begin in the short-term.
  - ❖ The Town should coordinate the implementation of the TDR program with large land owners within the May River in strategic locations and provide the Town an opportunity to buy land targeted for development. Preserving this land will decrease future impervious area, thus increasing the protection of (or possibly improving) water quality.

The following table provides a list of potential strategies (i.e. types of projects, both structural and non-structural) for the pollutant sources of interest for this Action Plan: septic/sanitary sewer, wildlife/domestic animals, varying and altered hydrology. The general pros and cons for each strategy are listed in the table. The pros and cons of each strategy are then compared to the specific conditions for the May River Watershed and the priorities, resources, partners, and schedule requirements of the Town to identify which projects to omit from the Action Plan and which ones to plan to implement in the short, medium, and long-term.

Table 4-1: Potential Strategies for Pollutant Sources of Interest

POLLUTANT SOURCE: SEPTIC		
Type of Project	**Pros**	**Cons**
Connect septic areas to sewer	• Effective - removes septic as a source • New development in areas served by sewer allows for more flexible site design.	• High initial capital cost Feasibility along May River • Property owners resistance to paying utility fees
Septic Inspection Program	• Identifies potential sources • Ease of implementation • Low implementation cost • Program can be customized to critical areas	• Only identifies problems, does not address them • Jurisdiction issues • Availability of inspectors

Septic Maintenance Program	• Addresses potential sources
	• Medium cost, with alternative funding options
	• Good success rate when incorporated with education, social marketing, and shared-costs programs
	• Program can be customized to critical areas
		• Jurisdiction issues
		• Property owner accountability
		  ○ Problems must be identified
		  ○ Reluctance to participate because of perception of being "in trouble" for problems
		  ○ Resistance to paying for maintenance/ upgrades
		  ○ Economic hardship for low- or fixed-income residents.

Septic Policy/ Ordinance	• Low implementation cost • Requires limited resources • Preventative measure	• Political/ jurisdictional considerations • Feasibility of enforcement
Property Owner Assoc. Covenants, &, Restrictions	• Low implementation cost • Requires limited resources • Preventative measure	• Need consensus and voluntary support • Feasibility of enforcement
Septic System Cleaning Incentive Program	• Addresses potential sources • Medium implementation cost • Good success rate when incorporated with education, social marketing, and shared-costs programs • Program can be customized	• Jurisdiction issues • Reduces property owner accountability • Need to develop a prioritization process that is perceived as "fair" to meet budget constraints
Septic retrofits	• Replace/upgrade with innovative septic technologies (e.g., recirculating sand filters) • Reduce pollutant loads in critical areas (e.g. stream buffer) • Adapt to soils that are not well suited for septic systems	• Cost • Increased maintenance requirements

Table 4-1: Potential Strategies for Pollutant Sources of Interest

POLLUTANT SOURCE: WILDLIFE/DOMESTIC ANIMALS		
Type of Project	**Pros**	**Cons**
Physical barriers (e.g., fences)	• Effective	• Maintenance • Aesthetics • Crossing Property Lines • Crossing jurisdictions • Crossing critical areas • Cost
Dog waste: Install signs to pick up after pets as well as pet waste stations	• Simple • Immediate impact	• Maintenance • Cost and supplies
Expand forested buffers	• Provide more of a filter between wildlife and waterways • Lower population densities around waterways	• Expensive • Not much incentive for private land owners
Reduce food sources for wildlife in developed areas (e.g., trash cans, dog food, bird seed); Include in nuisance ordinance	• Relatively low cost and simple. • Good Housekeeping practices	• May be difficult to enforce
Re-introduction of predators of problem species	• May re-stabilize ecosystem	• May require permits • May not be accepted by the public • Risk causing negative ecological changes • Requires in-depth knowledge of ecology and zoology
Hunting/culling	• Low-cost, if public allowed or recruited to hunt. • Most prevalently applied type of population control strategy	• May not be accepted by the public • Limited to species not protected by federal or state regulation • Requires population estimate surveys • Long-term commitment must be made to this strategy
Wildlife Corridors	• Disperses population • Provides opportunity to move wildlife from riparian buffers	• Cost

Table 4-1: Potential Strategies for Pollutant Sources of Interest

POLLUTANT SOURCE: ALTERED HYDROLOGY		
Type of Project	**Pros**	**Cons**
Regional Pond	• Effective treatment for fecal coliform • Treats a large area • Scalable • Can be an amenity • Can increase detention time/reduce pollutant loading	• Requires a large area • Can affect several property owners • Access • Long-term maintenance • High initial cost • Increased liability for landowner • Does not reduce runoff volumes
Wetland Restoration/ Retrofit Ditching	• Reduces velocity • Increases holding time • Reduces re-suspension of sediment/fecal coliform	• Need to obtain easements • Possible high initial cost • Requires multiple permits • Can affect developed area tailwater and increase flooding
Retrofit lagoons/ ponds	• Can increase detention time/reduce pollutant loading • Limit flushing wetlands • Fairly low construction cost	• Need to obtain easements • High design cost • O&M expenses • Does not reduce runoff volumes
Incentives to encourage LID/retrofits	• Provides volume control and pollutant load reductions • More involvement from private community in maintaining/managing controls • Encourages land donation/trade from private land developers/commercial properties (i.e. allow the use of their land for LID features, paid for by the Town or in exchange for a user fee reduction). • Encourages higher standard of maintenance and management of stormwater controls by those living in the private community	• Need support from developers, contractors, and property owners • Lack of knowledge of LID techniques • Reluctance of designers/developers for liability of newer technology/concepts • Cost of incentives to Town/County • Long Term O&M expenses

Table 4-1: Potential Strategies for Pollutant Sources of Interest

POLLUTANT SOURCE: ALTERED HYDROLOGY		
Type of Project	**Pros**	**Cons**
Runoff Reduction (e.g. pervious pavement, rainwater and stormwater harvesting)	• Reduce runoff volume • Reduce pollutant loading from runoff • Reduce use/cost of treated water bill • Upgrades can be incorporated during maintenance efforts	• Must entice public to cooperate • May increase maintenance burden and installation cost • Harvesting is not as reliable a source of water as public or well water
Design Storm Recommendations / Alternative Design Storms	• Increase water quality • Reduce erosion • Allow for increased regulation of site discharges	• Code / ordinance update and adoption • Plan review enforcement

Table 4-1: Potential Strategies for Pollutant Sources of Interest

POLLUTANT SOURCE: VARYING		
Type of Project	**Pros**	**Cons**
Education	• Relatively inexpensive • Effective when public cooperates	• Must entice public to cooperate
Horse Manure Management & BMPs	• Effective reduction in fecal coliform	• Must get horse farm owners to cooperate
Individual homeowner BMPs	• Reduce failing septic systems • Reduce stormwater leaving lots	• Expensive • Must get homeowner to cooperate
Unified Development Ordinance Amendments	• Wide-spread implementation which could increase overall pollutant load reduction • Allow for enforcement/earlier action from Town	• Effective only for new construction • Increase new construction costs
Land Acquisition	• Protect land from development • Provide wildlife habitat/corridors	• Cost
Development Agreements/ Incentives	• Low Cost • Requires limited resources • Preventative measure	• Need support from developers, contractors, and property owners • Feasibility of enforcement • Cost of incentives to Town/County
Transfer of Development Rights	• Protect land from development • Preventative measure • Provide wildlife habitat/corridors	• Cost (or banking mechanism) • Requires coordination and negotiations • Need support from developers and land owners
Solar Aerators for existing ponds	• Increase “treatment” ability of pond • Low maintenance requirement	• Must get property owner to cooperate • Upfront cost

4.2.2.4 Map of Targeted Project/Retrofit Options

Based on the hot spot identification map, hot spot attributes, and targeted retrofit option attributes described in the preceding sections, a strategic plan for general locations for targeted retrofit options has been developed. The attributes and map of targeted retrofit options will be used to identify specific projects and locations which are discussed in Section 4.3 – Retrofit Opportunities. Refer to Map 7 in Appendix D for specific projects, BMPs and their locations.

Based on current data and watershed inventory in this plan to date, three conditions have been noted for recurring hot spots for fecal coliform loading. They are:

- ✓ **Smaller sized waterbodies under tidal influence** – The upper sections of the May River experience less tidal flushing and freshwater input is more pronounced (stormwater runoff and groundwater infiltration) as compared to the lower portions of the watershed. For areas more affected by the tide, flushing provides an extensive exchange of water (and the bacteria that it may contain) in the river as the tide comes and goes; and freshwater inputs reduce the salinity, which has been inversely related to fecal coliform concentrations. Therefore, higher fecal coliform concentrations can be related to increased freshwater input, decreased salinity rates, and a lesser opportunity for tidal volume exchanges. In the May River Watershed, the applicability and importance of this concept is supported by observed elevated fecal coliform levels in the headwaters areas where there is increased freshwater input and less natural flushing by tides. More detailed discussions are provided below:
  - ❖ The higher concentrations of fecal coliform related to waterbody size and flushing rates can be aggravated by both septic systems and altered hydrology. Failing septic systems and other sources of fecal coliform are more problematic in the headwaters because less tidal influence provides less salinity and therefore less reduction of coliforms.
  - ❖ Altered hydrology from areas with older stormwater management BMPs with less volume control and higher impervious cover result in additional freshwater input, temporarily reducing salinity in receiving waterbodies. Practices such as constructing deep ditches with inverts lower than the water table elevation to convey stormwater runoff, can also lead to intercepting groundwater flows that provide an additional runoff volume beyond those related to rainfall. As stated above, such altered hydrology can provide increased runoff volumes with associated pollutant loads, and can decrease the residence time for natural (e.g. UV and particle settling) processes. The result can be higher pollutant loading to the receiving waterbody.
- ✓ **Undeveloped Sub-Watersheds** - Higher fecal coliform concentrations were observed in undeveloped sub-watersheds in the headwaters when compared to recently developed sub-watersheds (e.g. Palmetto Bluff) with post-construction BMPs.

- ❖ The monitoring results in the undeveloped sub-watersheds support the suspicion that wildlife, especially in undeveloped areas surrounded by developed areas where wildlife appears to be more concentrated, may be a prominent source of fecal coliform in the headwaters.
- ❖ The natural background pollutant loads need to be quantified and considered so that the Town does not spend significant effort to address conditions that are beyond their control.
  - *<u>Note:</u> This does not suggest that more development with advanced BMPs will be more protective than maintaining natural (undisturbed) conditions. However, the May River monitoring results, for specific undeveloped sub-watersheds in the headwaters, suggest that these areas may have naturally higher than normal pollutant loads.*

✓ **Developed Areas** - Fecal coliform increases have been noted since the 1990s which correlates with development trends ("Water Quality Concerns in the May River", DNR, 2010). Monitoring results for fecal coliform (as well as phosphorus and turbidity) from developed sub-watersheds in the headwaters were typically greater than other sub-watersheds in the May River.

- ❖ The monitoring results support the theory that altered hydrology, as well as land use changes and activities associated with development, has exacerbated fecal coliform levels. Older developed areas, which do not have improved BMPs and policies, will require a separate approach from new (proposed) development.

4.3 Retrofit Opportunities

Retrofit projects can take the form of being either Public Projects, Private Projects, or Public/Private Projects, depending on who the partnering entities are. Public Projects are often the simplest option because neither land acquisition nor property owner cooperation is required and the responsible party for implementation and maintenance is identified. There are, in terms of technical feasibility, many private retrofit opportunities throughout the May River Watershed. However, because the land is not publicly-owned or under public control, these types of projects would most likely be paid for without any public funds – making it a far more complex strategy to employ. Public/Private partnerships would require an agreement between the Town and the landowner/developer outlining which party would be responsible for the financial, technical, and operational responsibilities of the project (or system upgrade). However, while reviewing potential project retrofits, no projects, whether public, public/private, or private, were excluded/demoted due to the potential for a partnership. All projects were reviewed for technical merit, and those that could provide the most benefit to the May River water quality, regardless of cost/implementation strategies, were recommended as the best project retrofits.

It is important to note that new development must meet current stormwater management requirements, while existing development can generally be retrofitted to provide additional

treatment from current conditions even though it may not meet existing standards. There may also be opportunities for design revisions in approved but not-yet-built developments, which would be designed to meet or exceed the current requirements and address the goals of this Action Plan.

One of the biggest threats to any watershed improvement/protection plan is not taking early meaningful steps. Often the full list of projects needed to completely restore/protect a watershed can overwhelm the decision making process and prevent improvement from taking place. Therefore, recognizing that all priority projects have been identified as such due to their anticipated performance, their rate of implementation becomes an important factor as the cumulative loading reductions will be higher due to earlier implementation of projects.

This section identifies potential retrofit opportunities and a scope toward their implementation. Many of the projects and deliverables in this section will aide in meeting the eventual MS4 requirements for the Town of Bluffton. Retrofit opportunities should be located in high profile locations to provide outreach and inspiration to stakeholders who may be involved in the other retrofitting opportunities, as discussed in Section 4.4 – Timeline of Implementation Schedule and Section 4.5 – Communications and Marketing.

4.3.1 Identification of Types of Projects

Of the types of projects previously discussed (i.e. Wildlife, Septic, Hydrology, Ordinance and Education), the following projects are the most feasible for projects in the May River watershed because they most closely compliment the conditions of the May River Watershed and the Town's goals.

More detailed feasibility studies would need to be conducted before a formal design can be pursued for the projects. However, the information in Section 5.4 - Administration can be used to enable the Town to perform (or solicit a qualified design firm to perform) or partner to complete such efforts.

- ✓ Hydrology
  - ❖ Regional Ponds
  - ❖ Wetland Restoration/Retrofit Ditching
  - ❖ Retrofit lagoons/ponds
  - ❖ Retrofit swales
  - ❖ Bypass wetlands
- ✓ Low Impact Development (LID)
  - ❖ Rainwater harvesting
  - ❖ Rain gardens
  - ❖ Pervious pavement
- ✓ Education programs
- ✓ Wildlife Controls
  - ❖ Wildlife survey
  - ❖ Loading calculations

- ❖ Herd thinning
- ❖ Trapping

- ✓ Pet waste management
- ✓ Septic Programs
  - ❖ Partnering to offer funding and assistance through grants
  - ❖ Negotiating better prices with contractors
  - ❖ Offering free/reduced inspections
- ✓ Property Owner/Association Education Programs
- ✓ Incentives to Encourage Retrofits/LID
  - ❖ Working with developers to demonstrate how to implement LID techniques in a way that increases their profitability while meeting overall stormwater goals
- ✓ Individual Home BMPs in Approved Developments
  - ❖ Rain Barrels
  - ❖ Rain Gardens
- ✓ Rainwater Harvesting for irrigation from local ponds
- ✓ Development Agreement Modifications
- ✓ Property Owner Association Covenants, Codes, and Restrictions Modifications
- ✓ Transfer of Development Rights Program (broader implementation)

4.3.2 Prioritizing of Structural Projects in Need of Retrofit

Prioritization criteria are used to rank potential projects and identify which projects should be implemented in what order. The below list of generalized prioritization criteria was used to identify which potential projects would be a best for the identified hotspots and targeted project areas identified in Section 4.2.2 - Hot Spot Identification and Targeted Retrofits.

The prioritization criteria that was used consists of the following items:

- ✓ BMP Effectiveness
  - ❖ The type of project was reviewed to ensure the project would be effective at improving the fecal coliform levels within the May River. Only projects effective for fecal coliform removal were prioritized.
- ✓ Adjacent Sampling Station Water Quality Data
  - ❖ Each project was reviewed to ensure its location would directly improve the water quality within the May River watershed based on locations of weekly water quality sampling stations. Those that were affecting areas of higher fecal coliform numbers were given a higher priority.
- ✓ Ease of Implementation
  - ❖ Projects were reviewed based on ease of implementation. Projects that were efficient and easier to implement were given a higher priority, however, projects were not eliminated due to potential hurdles.
- ✓ Available Area
  - ❖ Projects were reviewed based on current land use. Projects that were identified to have potentially easier access were given a

higher priority, however, no projects were eliminated due to potential hurdles.

- ✓ Construction Costs
  - ❖ Construction costs were determined for potential projects, however, projects were not eliminated/de-prioritized due to costs of construction.
- ✓ Schedule
  - ❖ Projects were reviewed to determine if they were recommended for the short-, medium- or long term implementation. Projects in the short-term were given a higher priority.
- ✓ Partnering
  - ❖ Proposed project locations were reviewed to determine current ownership of land, and to determine if partnering would be required.
- ✓ Feasibility
  - ❖ Projects that were efficient and had a higher feasibility for implementation were given a higher priority.
- ✓ Ability to complement local culture
  - ❖ Projects that complemented the surrounding land uses with greater ease were given a higher priority.
- ✓ Cooperation/Incentives for Private Property Owners
  - ❖ Possibility of providing incentives to the property owners could obtain more "buy-in" for the project and its success.

Upon evaluation, an overall priority was determined for the potential projects, and the highest priority projects are being recommended for the short-term projects. For projects that are recommended in the medium- or long-term future, the next recommended step would be to determine the importance of each criterion for future implementation by developing a weight value for each. Weighted values can be specifically developed to reflect local concerns such as available resources, funding, and stakeholder acceptance. The criteria and weight values can then be used to evaluate each potential project through a comparative ranking score. The ranking scores can then be used to develop the specific timeline implementations for future project implementation and the number of defined projects for each phase.

The following list of criteria should also be considered by the Town and the stakeholders during prioritization efforts, but are considered risks to implementation (i.e. negative scoring). Risks to implementation can be prohibitive and result in a "no-go" decision for a project, even if all other prioritization factors are favorable. For example, the most effective BMP project, in terms of annual pollutant loads removed, may be cost-prohibitive if it is above the Town's maximum budget available for a retrofit project or the land needed may not be acquirable. For the recommended projects in this action plan, these below contributors were not factored into the project recommendations as negative impacts (i.e., no projects were eliminated from the list due to potential costing). It is recommended in the future analysis that these risks be evaluated appropriately (i.e., efficient projects that will provide substantial improved water quality in critical areas should not be eliminated due to potential public/private coordination).

Risks to Implementation

- ✓ Cost above available budget
- ✓ Need for additional private area/access
- ✓ Negative public perception
- ✓ Wetland impacts/permitting
- ✓ Property owner willingness to participate
- ✓ Feasibility and responsibility for long-term maintenance and effective operations.
- ✓ Liability (real or perceived) for anticipated performance (efficiency removal) for new LID techniques that may not be fully defined in the Town codes and specifications and are being implemented as pilot projects

4.3.3 Prioritizing of Non-Structural Projects

The prioritization process described above can also be applied to non-structural projects. In general, non-structural projects do not have as many physical requirements and are therefore easier to prioritize (but not necessarily easier to implement). The below list of generalized prioritization criteria and risks to implementation were used to identify which non-structural projects would be a best fit for potential public projects. Likewise, these below risk factors were not factored into the project recommendations as negative impacts (i.e. no projects were eliminated due to jurisdiction, etc.). It is recommended in the future analysis that these risks be evaluated appropriately (i.e., efficient projects that will provide substantial improved water quality in critical areas should not be eliminated due to public participation, etc.).

Prioritization Criteria

- ✓ Effectiveness of BMP
- ✓ Water quality in adjacent sampling points
- ✓ Ease and cost of implementation
- ✓ Partnering opportunities
- ✓ Ability to compliment local culture

Risks to Implementation

- ✓ Public Participation
- ✓ Public Opposition
- ✓ Jurisdiction
- ✓ Ordinance/regulations
- ✓ Property Owner Association covenants and restrictions

4.3.4 Identification of Specific Projects for Retrofit

Specific areas for implementing potential projects were identified using the hotspots and target areas developed in Section 4.2.2 - Hot Spot Identification and Targeted Retrofits. These areas are shown on Map 7 in Appendix D and are described in the below matrices. Specific projects

that could be implemented for each project area were determined based on the feasibility for that project. Factors that were considered included:

- ✓ hydrology,
- ✓ proximity to the May River,
- ✓ available area,
- ✓ type of area (developed vs. undeveloped),
- ✓ level of fecal coliform,
- ✓ new residential development with regional BMPs and connections to utilities (availability of sanitary sewer connections, capability to implement "purple-pipe" reuse infrastructure),
- ✓ residential development with "grandfathered" stormwater controls,
- ✓ older residential with septic,
- ✓ undeveloped land with or without planned development, and
- ✓ buffer requirements.

The following tables provide a summary of the newly conceived projects, general project types, and the latest Town planned projects that provide water quality benefits, and are to be implemented as "public projects." The stormwater aspects that can be implemented into the Town's existing projects are shown on Map 7 in Appendix D.

Matrix – Based on the feasibility, the following potential projects were identified. The prioritization process explained in Section 4.3.2 - Prioritizing of Structural Projects in Need of Retrofit, and 4.3.3 - Prioritizing of Non-Structural Projects, should be used to rank the potential projects and develop an implementation schedule. More detailed feasibility studies should be conducted as dictated by the implementation schedule.

NEW STORMWATER PROJECT CONCEPTS

The below table presents the recommended BMPs that could be implemented throughout the watershed to improve fecal coliform levels within the May River. The implementation strategy for these items is generally the same, and has been described below as the General Plan. This General Plan includes:

1. Approaching the land owner for participation
2. Performing a detailed review of surrounding infrastructure for implementation
3. Proceeding to design, permitting and construction phases

These areas are detailed on Map 7 in Appendix D:

Table 4-2 Recommended BMPs

Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy
Area A – Future New Riverside area		
Construct Three New Stormwater Ponds, Modify One Existing Stormwater Pond	• Open Space • Location and Proximity to May River • High fecal coliform numbers of Adjacent Water Quality Station • BMP Effectiveness	General Plan
Area B – Kenzie Park Outfall		
Construct new stormwater pond	• Open Space • BMP effectiveness	General Plan
Area C – Rose Dhu Creek		
Construct one new stormwater pond	• High fecal coliform numbers of Adjacent Water Quality Station • BMP Effectiveness • High Feasibility • Cost higher because of existing lots	General Plan
Area D – Between Buckwalter Community Park and The Farm		
Construct ditch modifications in existing ditch to divert water into adjacent ponds/wetland restoration	• BMP effectiveness / Increase residence time/water quality • Ease of Implementation • Cost versus BMP effectiveness • Open Space	General Plan
Area E – Ditch north of Stoney Crest (or similar)		
Construct earthen ditch blocks in existing	• Location of project • Ease of implementation	General Plan

Table 4-2 Recommended BMPs		
Type of Project	**Justification (Why is this project beneficial?)**	**Implementation Strategy**
ditch/wetland restoration	• Open Space • Adjacent impairment of water quality stations • Value of BMP / cost vs. effectiveness	
Area F – Hampton Lake Retrofit		
Pond modification	• Location / potential affected basin • Open Space	General Plan
Area G – Lakepoint Drive		
Pond modifications for up to nine existing stormwater ponds	• Open Space around a portion of the ponds • Location/potential affected basin • BMP effectiveness	General Plan
Area H - Pinecrest		
Modify five stormwater ponds	• Open Space	General Plan
Area I – Pinecrest		
Modify three existing stormwater ponds	• Open Space • BMP effectiveness	General Plan
Area J – Town Property		
Expand existing Town stormwater pond	• Open Space • BMP effectiveness • Ease of implementation	General Plan
Area K – Guerrard/Wharf Street		
Modify existing pond/construct two new stormwater ponds	• BMP effectiveness • Not sure where these ponds are or if there is space for them	General Plan
Area L – Gascgione Bluff		
Construct Four New Stormwater Ponds	• Open Space • High fecal coliform numbers of Adjacent Water Quality Station • Location and proximity to May River • Cost versus BMP effectiveness • High Feasibility	General Plan
Area M – Traver Tract		
Modify three existing ponds	• Open Space • Location	General Plan

Table 4-2 Recommended BMPs		
Type of Project	**Justification (Why is this project beneficial?)**	**Implementation Strategy**
Area N – Ditch in Hampton Lake		
Construct earthen ditch blocks in existing ditch/wetland restoration	• Ease of implementation • Open Space • Value of BMP / cost vs. effectiveness	General Plan

Table 4-3: GENERAL STORMWATER PROJECT CONCEPTS

The below projects represent projects that could be implemented throughout existing Town facilities:

Project Area	Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy
Oscar Frazier Community Park	Pet Waste Management	• Increased participation/ high visibility for targeted participants (dog owners) • Low cost • Ease of implementation	Combine pet waste stations with an education element to encourage continued behavior in other areas
	Vegetated swales and rain gardens	• Low cost • Ease of implementation • Open Space • High visibility for targeted future participants	Add an education element to encourage implementation in other areas
	Additional pervious pavement	• Can be cost-beneficial compared to current pavement • Can be upgraded in conjunction with maintenance efforts	Implement in conjunction with maintenance effort and budget for event parking
	Raintank	• Stores and infiltrates runoff from the road	Look for suitable location to assess general feasibility
General Town & County Facilities (e.g. schools, library, fire department, parks)	Rain gardens	• Low cost • Ease of implementation • Open Space • High visibility for targeted future participants	Add an education element to encourage implementation in other areas
	Rain barrels & cistern	• Low cost • Reduces runoff while providing a needed water source for irrigation & ~~maintenance~~ • High visibility for targeted future participants • Supports local ordinance and leads	Add an education element to encourage implementation in other areas

Table 4-3: GENERAL STORMWATER PROJECT CONCEPTS

The below projects represent projects that could be implemented throughout existing Town facilities:

Project Area	Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy
		by example	
	Pervious pavement	• Can be cost-beneficial compared to current pavement • Can be upgraded in conjunction with maintenance efforts	Implement in conjunction with maintenance effort and budget
	Disconnect rain downspouts from storm drains	• Ease of implementation	Need to determine if surrounding area can support infiltration; or implement in conjunction with rain barrels
	Native Vegetation	• Materials are available • Reduces pesticide & fertilizer usage • Reduces irrigation need	
Road BMPs (partner with DOT)	Retrofit medians and swales to increase perviousness	• Open Space • Partnering opportunity • Low cost - simple design • High visibility	Approach DOT for partnering opportunity; Can be done in conjunction with road improvement projects

Table 4-4: PROJECTS INCLUDED IN CURRENT (FY 2012) TOWN PLAN

The below projects represent projects that could be implemented into projects that are already budgeted for FY2012.

Project Name	Project Description	Justification (Why is the project beneficial?)	Implementation Strategy
DuBois Park	Master Plan to include LID	• Project in early stages with public input • Land, funding and design addressed through other project objectives • Runoff reduction and other LID elements demonstrated	Make this part of the communication and marketing campaign; work with planning and designer teams to ensure LID elements are included
Pathways	Extending Town pathways	• Open Space • Partnering opportunity • Low cost - simple design • High visibility	Look for opportunities to use alternative parking surfaces – paths are mulched, but will need parking lots
Bruin Road Land Acquisition	Streetscape - LID	• Conceived and funded • Visible • Demonstration & Outreach opportunities	Promote the greener elements of the project; look for opportunities to apply techniques to other roadway projects
Town Hall Municipal Court	Concept Plan for Facility	• Conceived • High visibility • Demonstration & Outreach opportunities	Find runoff reducing techniques, and develop procedures for incorporating them into all municipal facility designs
Wharf Street Redevelopment / Affordable Housing	Construction of Green Cottages	• Conceived and funded • Open Space • Partnering opportunity • Low cost - simple design • High visibility • Demonstration & Outreach	Use this completed project to illustrate how others can do this as a private initiative New stormwater volume ordinance was adhered to through LID techniques

Table 4-5: PROJECTS FOR NEWER NEIGHBORHOOD DEVELOPMENTS

The below projects are projects that could be incorporated into specific existing neighborhoods

More recent residential development The Farm at Buckwalter; Hampton Hall; Hampton Lakes and Rose Dhu Creek Plantation		
Type of Project	**Justification (Why is this project beneficial?)**	**Implementation Strategy**
Pond retrofit	• Volume controls would be more effective in upland areas • Ability to improve performance of existing pond	Approach HOA for participation; modify maintenance agreement if appropriate; cost-sharing for retrofit
Wildlife controls	• Low cost • Ease of implementation • Addresses a nuisance problem in addition to a water quality issue	Add an education element to encourage participation
Rainwater Harvesting	• Volume controls would be more effective in upland areas • Depending on implementation, can have a low cost for a high return • Reduces runoff while providing a needed water source for irrigation & maintenance • Can implement on a case by case basis	Provide cost-sharing and education programs for rain barrels and irrigation systems from ponds
Pet Waste Stations /Other Pet Waste Programs	• Relatively low installation cost • Ease of implementation	Determine who is responsible for maintenance; implement waste stations

Table 4-6: PROJECTS FOR OLDER NEIGHBORHOOD DEVELOPMENTS

The below projects are projects that could be incorporated into specific existing neighborhoods

Older residential development Gasciogne Bluff; May River Plantation		
Type of Project	**Justification (Why is this project beneficial?)**	**Implementation Strategy based on Prioritization Rankings**
Wildlife controls	• Low cost • Ease of implementation • Addresses a nuisance problem in addition to a water quality issue	Add an education element to encourage participation
Septic Programs	• Direct source reduction • Can address homeowner need in addition to water quality issue • Can regulate inspections to determine effectiveness of systems • Can regulate maintenance practices and standards to determine when repairs and improvements are required	Can work with septic provider to implement incentives, such as free inspections.
Rainwater Harvesting	• Depending on implementation, can have a low cost for a high return • Reduces runoff while providing a needed water source for irrigation & maintenance • Can implement on a case by case basis	Provide cost-sharing and education programs for rain barrels and irrigation systems from ponds
Regional Ponds	• Proximity to May River provides greater benefit for pollutant reduction • Could offer amenity to community	Approach land owner for participation; detailed review of surrounding infrastructure for implementation as well as determination of overall affected basin; proceed to design, permitting and construction phases
Retrofit Ditches	• Because of location and extent in the watershed, greater potential for pollutant reduction	Determine permitting requirements; Approach land owner for participation; detailed review of surrounding topography / infrastructure for implementation and definitive basin affected; proceed to design, permitting and construction phases

Older residential development Gasciogne Bluff; May River Plantation		
Type of Project	**Justification (Why is this project beneficial?)**	**Implementation Strategy based on Prioritization Rankings**
End-of-pipe retrofits	• Limited land requirement • Low visibility to general community	Approach land owner for participation; proceed to design, permitting and construction phases
Pet Waste Stations /Other Pet Waste Programs	• Relatively low installation cost • Ease of implementation	Determine who is responsible for maintenance; implement waste stations
Wetland Retrofit	• More available area to increase holding volume and detention time for wetlands • Proximity to May River	Determine permitting requirements; Approach land owner for participation; proceed to design and permitting.

Table 4-7: PROJECT DEVELOPMENT IN ALL NEIGHBORHOODS

The below projects represent projects that can be incorporated into any neighborhood development.

All Neighborhoods		
Type of Project	**Justification (Why is this project beneficial?)**	**Implementation Strategy**
Promote water conservation practices	• This will reduce the amount of surface water generated, thereby reducing overall runoff and fecal loading	Create / distribute education promotions demonstrating the value of water conservation, with practical applications for implementations
Provide community education for pet waste pick up	• This will reduce the loading generated from the residential landuses	Meet with HOA/subdivisions; discuss how to best implement in each specific neighborhood (locations of pet waste stations); provide maintenance strategies for HOAs to maintain/clean stations
Promote individual LID projects, such as rain barrels and rain gardens on residential lots	• This will reduce the amount of surface water generated, thereby reducing overall runoff and pollutant loading	Hold information sessions hosted within each neighborhood to educate the community on the value of these items, where they can purchase, and how they can implement.
Hold Stakeholder meetings to encourage Homeowners Associations to periodically and consistently review regulations and promote new regulations.	• This will provide an opportunity to update each community on the status of the watershed, and remind them of the importance of taking action	Hold regularly scheduled information sessions for all HOA representatives to attend, where they can share ideas between HOAs of implemented programs that are working, and the Town can provide feedback towards the status of the watershed.

Table 4-8: REVIEW/UPDATE DEVELOPMENT POLICIES

The below projects are items that should be reviewed for update in Town's development policies and ordinances

Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy
Include a temporal clearing guide, that requires construction milestones within a specific timeframe from site clearing	• This will allow for bare sites with no stabilization to be regulated to avoid sites being cut and then sitting for years until the developer proceeds with the construction.	Review existing ordinances for implementation
Reduce overall imperviousness by implementing pervious pavement	• This will allow for additional pervious areas, which will reduce the overall site runoff	Review existing ordinances for implementation
Promote implementation of stormwater harvesting	• This will reduce the overall runoff, thereby increasing the water quality	Review existing ordinances for implementation
Coordinate with developers and land owners to promote transfer or purchase of development rights transactions	• This will allow for more land to remain in its natural state, reducing the amount of future runoff and pollutants generated	Review existing approved planned developments and development agreements for sunset dates; Discuss with land-owners and developers; Use as part of PUD renegotiations; Consider using Town funds to purchase credits more aggressively when there are no buyers.

4.4 Timeline of Implementation Schedule

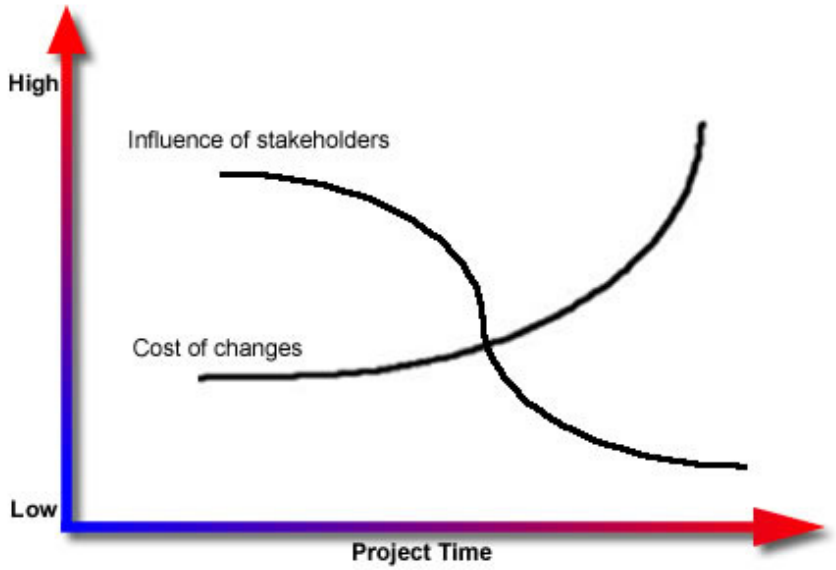
A timeline is provided so the short-, medium-, and long-term solutions will have some measure of success (or progress), while allowing for the local, regional, county, state and Federal government to assess and assign priorities. All projects and programs have been included based on their technical merit. The timeline for implementation is based on the complexity of their implementation. In some cases it is due to their scale, which can require more lead time for partners, funding, and land needs. In other cases it is based to the need to validate their anticipated performance through more field monitoring and/or modeling. Lastly, the timeline for a particular project can be affected by the logistics of Town projects planned/initiated prior to this Action Plan which can serve the goals of the May River.

The May River Watershed Action Plan will have a phased implementation focusing on:

- ✓ Short-term projects/programs in Phase I (year 1 – 3 of plan implementation),
- ✓ Medium-term projects/programs in Phase II (years 3 – 5),
- ✓ Long-term projects/programs in Phase III and Phase IV (years 5+),

It is expected that Phases I through II of this plan will take 5 years to implement. Phases III and IV include long-term implementation of policies and projects which may have been planned and initiated in earlier phases but require more than 5 years to complete and assess the impacts.

Timeframe priorities are also based on the fact that the cost of changes is lowest and the influence of stakeholders the highest at the beginning of a project, while the cost is highest and influence of stakeholders is lowest at the end of the project. In other words, by taking the time to reach out to the potential stakeholders of a project in the earliest of stages, the project is most likely to have their support during the actual implementation. Furthermore, in doing so, the increased costs of the later phases of project development will not be at risk due to the time that was invested to communicate the goals of the project early on. This applies to all three primary project types (public, public-private and private). However, structural BMP projects, such as new or modified ponds, will be associated with greater costs than the programmatic projects such as septic tank maintenance and the adoption of Low Impact Development techniques.



The May River Watershed Action Plan should have a phased implementation schedule as follows:

- ✓ Phase I – Phase I includes this watershed plan and short-term actions that have already been initiated or scheduled within the first three years of implementation (e.g. impervious study, 319-project).

- ✓ Phase II – Phase II includes projects and actions that can be planned, initiated, and implemented within the next 5 years. These projects may not have approved funding sources yet. These actions may include policy and regulatory changes that will require a longer timeline and more stakeholder involvement for full implementation. These policy and regulatory changes may be planned and initiated in Phase I but full implementation will not be complete until Phase II.

- ✓ Phase III – Phase III will include projects and actions that will continue implementation beyond the five years from plan implementation. As with Phase II, these actions may include policy and regulatory changes that will require a longer timeline and more stakeholder involvement for full implementation. These policy and regulatory changes may be planned and initiated in earlier phases but full implementation will not be complete until Phase III. This phase will also include long-term monitoring and evaluation of the implemented BMPs.

- ✓ Phase IV – Phase IV will include long-term projects and actions that will continue implementation beyond the eight years from plan implementation. These actions may include policy and regulatory changes or projects that will require a longer lead time for planning and more stakeholder involvement for full implementation. Activities may be planned and initiated in earlier phases but full implementation will not be

complete until Phase IV. This phase will also include long-term monitoring and evaluation of the implemented BMPs.

In recognizing and understanding the factors that influence the priority of a particular recommendation within this Action Plan, the timeframe of action items (projects, policies, and programs) is provided in the table below. The details of each (description, partnering and funding options, cost etc.) can be found in the preceding sections.

It is recognized that the May River Watershed Action Plan is a dynamic and ever-evolving document that will be updated and refined as new and better information becomes available. Therefore, it is understood that the timeframe associated with a deliverable may change based upon new information or a change of scope within a deliverable. These changes are healthy and necessary for a successful plan and will reflect our greater understanding of the complex and unique ecosystem of the May River.

NOTE: Action Items with an asterisk (*) are recommended for discussion and planning in the short- to medium-term, but will be implemented on their full-scale over the long-term.

Table 4-9: PHASE I IMPLEMENTATION SCHEDULE

Action Items	Status
Create Impervious Surface Map	Complete
Final SCDHEC 319 Grant Report	In Progress
RV / Campground Waste Management Plan	Complete
Rain Barrel/Rain Garden Program	Complete
Pet Waste Stations	Complete
Social Marketing Campaign	In Progress
Delineate May River Watershed	In Progress
Unified Development Ordinance Overhaul	In Progress
Pilot Projects	In Progress
Construction Site Inspection Program	In Progress
Ditch Enhancement / Erosion Prevention	In Progress
Transfer of Development Rights Program	In Progress
*Develop Model to Predict Fecal Coliform, stormwater volume, and other indicators	Short-term

Table 4-10: PHASE II IMPLEMENTATION SCHEDULE

Action Items	Timeframe
Look to incorporate in FY 2012 Town Projects: Converting septic service to sewer service	In Progress and Short- to Medium-term
Look to incorporate in FY 2012 Town Projects: Implementing the use of pervious surfaces, such as concrete for sidewalks, pavement for parking lots, roadways, driveways, etc.	In Progress and Short- to Medium-term
Look to incorporate in FY 2012 Town Projects: Increase education through the communication and marketing plan to make citizens aware of the Town's projects and their goals, including water quality	In Progress and Short- to Medium-term
Look to incorporate in FY 2012 Town Projects: Implement runoff reduction techniques in new projects, such as recreational areas	In Progress and Short- to Medium-term
Look to incorporate in FY 2012 Town Projects: Incorporate runoff reduction techniques, such as landscaped medians that have a dual use for bioretention/detention, on roadway/streetscape projects	In Progress and Short- to Medium-term
Bird Roosting Deterrent	Short-term
Area A – Construct New Stormwater Ponds and Modify Existing Pond	Short- to Medium-term
Area B – Construct New Stormwater Pond	Short- to Medium-term
Area C – Construct New Stormwater Pond	Short- to Medium-term
Area D – Modify Existing Ditch and Adjacent Ponds	Short- to Medium-term
Area E - Construct Earthen Ditch Blocks	Short- to Medium-term
Sensitive Areas Determination	Medium-term
319 Program Septic System Inspections / Pump Outs	In Progress
319 Program Septic System Up-Grades / Replacements	In Progress

Table 4-10: PHASE II IMPLEMENTATION SCHEDULE

Action Items	Timeframe
Manure Management Plan	Medium-term
*Communications / Marketing Plan	Short- through Long-term
Survey and Analysis to better understand contribution of septic systems	Medium-term
Septic Inspection/Maintenance Program	In Progress
Septic System Cleaning Incentive Program	Medium-term
Septic System Education Program	Medium-term
*Wildlife Management Plan	Medium-term to Long-term
Coordinate with land owners, developers and legal counsel regarding Transfer of Development Rights	In Progress/Short-term

Table 4-11: PHASE III IMPLEMENTATION SCHEDULE

Action Items	Timeframe
*Increased volume control regulations	Medium-term to Long-term
Expand forested buffers to act as runoff filter	Medium-term
Public education campaign to reduce food sources for wildlife in developed areas (e.g., trash cans, dog food, feeding wildlife)	Medium-term
Public Education on Water Quality within the May River	Medium-term
Unified Development Ordinance Amendments	In Progress
Development Agreements/ Incentives	Medium-term
Septic Policy/ Ordinance	Medium-term
Property Owner Association Covenants, Codes, Restrictions	Medium-term

Table 4-12: PHASE IV IMPLEMENTATION SCHEDULE

Action Items	Timeframe
Rainwater and stormwater harvesting	Long-term

4.5 Communication and Marketing

The May River Watershed Action Plan will benefit from public understanding and support, as all of the recommended projects and programs require support from the local public and the development community. Behaviors will need to change, funds will need to be committed, land will need to be acquired and accessed, and partnerships will need to be developed and sustained. To achieve those goals, an easily recognizable, May River Brand is needed. To develop a successful brand, an effective framework for a communication plan is needed in the early stages of this Action Plan.

4.5.1 Communication/Marketing Plan Development

The Town of Bluffton is already engaged in a social marketing campaign that promotes environmental sustainability awareness in general, as well as specific ways to improve water quality in the May River. The social marketing campaign, initiated through the 319 Program grant project, should be considered an important element of the May River Watershed Action Plan. It should be used as the first step to developing an ongoing effort to protect environmental resources in the greater Bluffton area through the development of a May River Brand.

The following actions and objectives are components of the current 319 Program social marketing campaign, and can be used to provide the needed framework:

- ✓ Measurably increase awareness among residents that their behavior and activities impact the water quality of the May River;
- ✓ Develop and introduce to the public key messages promoting positive, behavioral change as part of a comprehensive community-based social marketing campaign that targets select segments of the local population such as pet owners, horse owners, septic system owners and others whose daily activities impact water quality, including the development community. Suggested messages include:
  - ❖ Protection and restoration of the May River is a local initiative, not simply a regulatory compliance effort…Local solutions to protect a local resource.

- ❖ Progress needs to take place early and continuously; progress will take place through technically-sound efforts.
- ❖ Water quality can be addressed through other valuable projects, such as roadways, recreation facility, and beatification projects – at a reduced cost with improved benefits.
- ❖ A multitude of options have been provided; finding opportunities to act, through local partnerships, will bring the Community better results sooner.

- ✓ Develop a variety of communication materials (print, radio spots, website, etc.) that will effectively and efficiently deliver key messages to the community;
- ✓ Create a campaign brand that is identifiable and compatible with other Town initiatives such as the Town of Bluffton Strategic Plan and the Unified Development Ordinance Code Overhaul.

Immediate Implementation Strategies

The Town of Bluffton contracted a consultant, Water Words that Work, LLC (Water Works), in January 2011 to develop and begin implementation of the social marketing campaign. The key milestones and deliverables that can be used to support this Action Plan are listed below, and should be coordinated closely with Water Works:

- ✓ Pre Campaign Research: During this task, neighborhoods are potential partners for public/private and private BMP projects and education programs will be identified.
- ✓ Focus Group: This focus group should also include potential partners for the Action Plan and solicit feedback for Action Plan programs and projects. It can be used as a good indicator of public perception that could impact the approval of projects or implementation schedule, both positively and negatively.
- ✓ Campaign Material Development: Initial campaign materials should focus on complementing the Action Plan's initiatives to generate understanding and support of the programs and build momentum to improve implementation of projects.
- ✓ Septic Owner Campaign: Because septic systems are a major strategy of this Action Plan and are located on private property, outreach efforts would benefit the private-public retrofitting components significantly.

Further social marketing tasks that should be implemented by the Town which will incorporate key elements from this Action Plan, include:

- ✓ Seeking support for funding and land acquisition for public projects, including those that are eligible for alternative funding sources (i.e. grants).
- ✓ Seeking feedback on more complex issues such as controlling wildlife to reduce bacteria sources associated with them.
- ✓ Providing incentives and technical guidance to enable private project implementation to maintain the natural hydrology and pollutant loading rates.

- ✓ Discussing long-term solutions such as the reuse water systems and stormwater harvesting to protect and conserve local water resources.
- ✓ Providing educational information and training which supports the behavioral changes;
- ✓ Gaining support for funding and implementation of structural projects and programs/policies;
- ✓ Seeking lessons to be learned from other coastal communities developing and implementing watershed action plans.

4.5.2 Communication/Marketing Plan Implementation

An education program is a very effective form of communication and marketing, and is the recommended method for implementation of this component of the Action Plan. When conducted in conjunction with action plan projects, it can raise awareness and encourage stakeholders, groups, and individuals to take action to improve water quality in the May River. The education program is a primary element of the May River Watershed Action Plan, and will serve both immediate and long-term goals.

Immediate Implementation Strategies

For the short- and medium-term, the following activities are recommended for early and frequent use to generate awareness and general publicity for the Action Plan. Some may continue (see Long-Term Strategies), while others may be used in a more limited manner depending on their effectiveness. It is important to note that a broad variety of tactics are recommended at the start, so that the most effective can be refined for efficient use on an on-going basis:

- ✓ Newspaper/newsletter articles: these can highlight BMP projects and their benefits to the May River
- ✓ Signage: these can highlight BMP projects and their benefits near BMP projects (i.e. signs near pet waste stations or pond retrofits)
- ✓ Local organizations: Involving these groups in BMP implementation is a direct and rapid way to disseminate and receive information. They are self-motivated and are typically open to discussion on issues that affect the community.
- ✓ Educational workshops: these events can be scheduled in conjunction with local organizations to demonstrate small-scale (private) BMP projects (e.g. rain gardens, pervious pavement).
- ✓ Informational forums: when done with neighboring communities who have developed or are developing watershed action plans, lessons learned can be shared and ideas can be exchanged to allow for more rapid adoption of action (ex. SC DNR LID manual with forum in Bluffton area).

Long-Term (On-going) Implementation Strategies

Long-term goals for the education program should focus on more complex policy changes that require preparation time and consensus building. Although they are considered Long-term goals, they really represent efforts that need to begin early and are expected to continue for the life of the Action Plan and beyond. Below are the more common on-going communication and education tactics that have been successful in communities like Bluffton.

- ✓ Public meetings: These offer several advantages:
  - ❖ Establish booths which will inform the community about the Action Plan while gaining support for the initiatives (e.g. educate the community about potential policy changes)
  - ❖ Provide an opportunity for stakeholders to ask questions; and
  - ❖ Measure public perception as an indicator of feasibility/success of the policies and projects
  - ❖ Set up at municipal facilities or community events to target specific audiences needed for public support of projects and policies.
- ✓ Newspaper Publications: More information published in local publications to keep the public informed of the progress of the Action Plan and build momentum for future phases.
- ✓ Flyers/mailings: like the local publications, to keep the public informed of the progress of the Action Plan and build momentum for future phases.
- ✓ Education workshops: these not only target behavioral changes which support the overall objectives of the Action Plan, they also act as a forum to garner support and funding of projects.
- ✓ Stormwater Hotline/Help Line: Although on-line communication has become a common part of our society, those who feel compelled to inquire or report concerns often feel most comfortable with a live representative. This will allow for emergency situations to be reported immediately for quicker resolution, as well as individual homeowners who have questions can get resolutions and be proactive about implementing them.
- ✓ Stormwater Website: The Town's website is capable of providing necessary information, but a companion website can often support the branding campaign efforts. Implementing a website geared toward stormwater ideas for implementation for private landowners will give homeowners a tool to implement BMPs on their individual lots. Likewise, this website can provide information on upcoming HOA discussion meetings regarding stormwater, and status updates on policy review/changes regarding stormwater.
- ✓ E-mail newsletter and notices: Offering interested parties to register for additional information, through e-mails and e-newsletters, offers the Town a way to disseminate information quickly, inexpensively, and sustainably (i.e. use less paper). It also offers a mechanism to track stakeholders who should be invited to future events and information exchanges, and can help with locating them throughout the watershed to identify locations that may need more attention. The more often the public receives information regarding water quality issues and steps they can take to improve the water quality, the more likely they will be to start implementing the little steps on their own. This will also provide an opportunity to notify the homeowners of the status of ongoing programs, and updates to the watershed.

5.0 Financial Mechanisms and Administration

A program of this scale requires a focus on a wide and far-reaching variety of funding mechanisms. It is not probable that a single funding source (such as Section 319 Grants) will provide adequate support for implementing the full Watershed Action Plan. However, understanding the broad range of funding options in the context of the bigger watershed picture will let decision makers capitalize on a framework for implementation that evaluates all resources.

5.1 Financial Analysis of the May River Watershed

There are several methods by which the Town can assess how revenue is being collected for and allocated toward watershed improvement projects and programs. These include, but are not limited to:

- ✓ Comparing annual revenues from the Stormwater Utility Fee and other sources (grants, general fund, etc.) to the annual expenditures (capital projects, consultant fees, monitoring, etc.).
- ✓ Comparing the total revenue from Town sources (general fund, Stormwater Utility Fee, etc.) to the total project value, which would include other valued services such as donated land, services, and monetary contributions from partners (the County, 319 Grants, etc.).
- ✓ Comparing the estimated cost of projects and programs to the anticipated annual pollutant load reduction.
- ✓ Comparing the locations of the revenue sources throughout the Town to the locations of the expenditures.

The first two methods are expected to be most practical and informative for the Town's stormwater management efforts, based on the goals of the program (and this Action Plan) and the current and anticipated sources of revenue. Such methods can answer the following questions:

- ✓ "Is the Town spending the available resources in a timely manner to expedite implementation (and positive results)?"
- ✓ "Is the Town reserving a reasonable portion of the annual resources to address unexpected project and program expenses (staffing needs, equipment purchases, or construction costs), or to be able to capitalize on unexpected opportunities (grants, and other partnerships)?"
- ✓ "Is the Town leveraging opportunities to receive additional resources from partnerships, or identifying other Town initiatives (projects or programs) that can serve the goals of this Action Plan without additional cost?"

The latter two methods are not expected to provide significant value to the Town at this time, for the following reasons:

- ✓ Without a robust pollutant loading model and project implementation experience (construction costs and field verified performance), the cost-benefit analyses will need to be limited to project prioritization to make implementation decisions. Making financial assessments without enough data can lead to false conclusions, both overly optimistic and pessimistic, on the program's performance and value to the Town. Eventually this can be a useful method, so it should be considered a secondary method and not permanently excluded from consideration.

- ✓ Watershed improvement projects like this offer value to contributing parties that reside outside of the watershed boundary (increased property value, recreational opportunities, etc.). They also do not offer equal value to each contributing party within the watershed, as not all residents and business owners will have the same opportunity or inclination to make use of the value that resources like the May River have to offer. It is recommended, however, that a variety of projects and programs be implemented across the Town, whenever practical - but not at the expense of the technical objectives that they are aimed at achieving.

Therefore, it is recommended that the Town continually record revenues and valued services collected from partnerships, and that all projects that offer water quality benefits be listed and quantified for their value. In some cases, such as a roadway widening project, the full capital cost should not be taken credit for – but the water quality features that the project provided can be quantified and recorded. That annual revenue/services amount can then be compared to the expenditures on an annual and cumulative basis to assess the financial effectiveness and efficiency of the program. Other financial planning methods that the Town may use for other programs can also be applied to determine if the rates of collection and spending offer the Town the financial solvency and stability the Town requires of other programs.

5.2 Expected Funding Requirements (Budget) with Scope Summary

Funding and budget requirements will be project-specific based on the type, size, and schedule of the project. Efforts should be made to coordinate action plan initiatives with other programs and projects to reduce costs and efforts.

The following general estimated costs have been identified per project types identified in Section 4.3 – Retrofit Opportunities, for the short-term project recommendations. Specific costs should be developed as part of the feasibility study for each project and will depend on project-specific details like size, schedule, partnering, and donations. These projects recommended for the short-term have been shown on Map 7 in Appendix D.

Table 5-1: NEW BMP SHORT TERM PROJECT IMPLEMENTATIONS

Area	Location	Description	Approximate Construction Cost
A	Palmetto Bluff area	Expand/modify one existing pond, and create three new ponds.	$ 1,025,000
B	Stoney Creek	Create one new pond.	$ 2,125,000
C	Between Hampton Hall and Rose Dhu	Create one new pond.	$ 1,000,000
D	Hampton Hall	Divert existing ditch into adjacent existing ponds for increased residence time.	$ 50,000
E	Hampton Lake	Install earthen ditch blocks.	$ 50,000
Total Short-Term Project Approximate Cost			$ 4,250,000

Table 5-2: SEPTIC, WILDLIFE AND VARYING SHORT-TERM PROJECTS FOR IMPLEMENTATION

Project Type	Description	Justification	Approximate Cost
Septic	Develop a Septic Policy/ Ordinance	Needed in order to develop an inspection and maintenance program	<$10,000 one time cost
	Property Owner Association Covenants, Codes, Restrictions	Codes should be consistent with septic policy ordinance.	<$20,000 one time cost
Wildlife/Domestic Animals	Dog waste: Install signs to pick up after pets as well as pet waste stations	Good and broadly accepted, community-wide stewardship practice to institute	$50-75 per sign and steel post. One time installation cost. 4 hours per week maintenance
Varying	Education	Specific education efforts identified in Wildlife, Septic and Altered Hydrology matrices	Vary based on media used.
	Unified Development Ordinance Amendments	Use to regulate on-lot practices for new residential development.	One time cost to develop ordinance estimated 8 hours per week (400 hrs of total work)
	Transfer of Development Rights	Reduce impervious surfaces and runoff for future sites within the May River Watershed	Varies based on interested developers/land owners. Main costs will include legal counsel and land acquisition.

Implementation Strategies

The Town should review annual budgets and planned projects to determine which of the action plan initiatives can be conducted in conjunction with already planned actions. Annual budgets should be developed to include the currently planned projects each year. Partnering and in-kind service agreements should be explored to identify potential cost savings. Feasibility studies should be conducted for the identified projects which should include more-detailed cost analysis.

Long-term projects should be identified with cost estimates so that funding mechanisms can be identified in the short-term and actions can be taken to secure funding (e.g. grant applications, partnering agreements, land donations, etc.).

5.3 Funding Analysis of the May River Watershed

5.3.1 Funding Mechanisms

This section identifies funding mechanisms and the key elements of each funding mechanism including: project types, limitations, estimated timelines, available funding, and contact information. The intent of this section is to assist the Town with identifying what mechanisms are available and feasible to support the Action Plan.

In general, these funding mechanisms are:

- ✓ Municipal programs and funds, including the local Capital Improvement Program
- ✓ Local Authorities/Opportunities
- ✓ State Authorities/Opportunities
- ✓ Federal Authorities/Opportunities
- ✓ Non-governmental Organization Funding
- ✓ Donated in-kind services, supplies, or property from private sector /nonprofit organizations. Examples include:
  - ❖ Volunteer labor for monitoring, BMP installation, maintenance.
  - ❖ Donated supplies for BMP construction from local businesses or property owners.
  - ❖ Donated equipment use/rental (e.g. construction equipment, water quality meters).
  - ❖ Donated property from private property owners, developers, organizations.
- ✓ Partnerships. Examples include:
  - ❖ Access agreements for private property from private property owners, developers, organizations, and other governmental departments such as SCDOT.
  - ❖ Maintenance agreements from private property owners, developers, organizations, and other governmental departments such as SCDOT.

- Partnership with academic institutions (such as internship programs or thesis work) for monitoring, research support, modeling, etc.

The following table summarizes the funding mechanisms by organization and key elements. This table is a living document that has been populated with best information available to date. As new information becomes available, this table should continually be updated.

Table 5-3: FUNDING MECHANISM SUMMARY

Organization	Program	Purpose & Limitations of Funds	Potential Funding	Timeline	Contact Information
Municipal funds	Town Referendum – 1% special purpose sales tax				
	Tax Increment Financing (TIF)				
	Municipal Improvement Development Fee (MIDF)				
	Special Purpose Tax District (i.e. May River Overlay District)				
Local Authorities/ Opportunities	Stormwater Utility Funding				
	Beaufort County Rural and Critical Lands Board (RCLB)				
	NRCS Environmental Quality Incentives Program				
	Watershed Protection Districts/Fees Beaufort-Jasper Water & Sewer Authority (BJWSA) Sewer Impact Fee Credits				
	Density Bank Rights				
SC Department of Health and Environmental Control (DHEC)	Clean Water State Revolving Loan Fund (CWSRF)	The CW SRF can provide low interest rate financing for wastewater treatment plants, interceptors, collection systems, and related facilities, relocation of sewer lines for highway widening, stormwater, and "green"	Varies; Over $100 million in financing available for FY 2011	Applications are accepted year-round; funding approved per fiscal year (July 1- June 30).	EPA: http://water.epa.gov/grants_funding/cwf/cwsrf_index.cfm SC: http://www.scdhec.gov/environment/water/srf.htm

Table 5-3: FUNDING MECHANISM SUMMARY

Organization	Program	Purpose & Limitations of Funds	Potential Funding	Timeline	Contact Information
		projects.			Mr. David Price State Revolving Fund Section Bureau of Water 2600 Bull Street Columbia SC 29201 pricedc@dhec.sc.gov
	319-grant	Nonpoint Source Pollution Control Projects	Up to $1.2 million available; typically ~$50,000 - $300,000 per project; 60/40 match	Proposal deadline is typically in Dec	Ms. Meredith Murphy Bureau of Water 2600 Bull Street . Columbia, S.C. 29201 Phone: (803) 898-4300 MURPHYMB@dhec.sc.gov
Other SC state organizations (or delegated to state from federal government)	Recreational Trails Program Grant	This grant provides funds for acquisition and/or development of motorized or non-motorized trails. This fund could be considered for planned biking/walking paths using pervious materials.	$10,000 - $100,000; 80/20 match	Letter of Intent due around December 7. LWCF proposal due around March 23.	*http://www.fhwa.dot.gov/environment/rectrails/* *http://www.sctrails.net/trails/TRAILSPROGRAM/GRANTS/grants.html* Ronda Pratt, State Trails Coordinator SCPRT - State Trails Program Recreation, Planning, and Engineering 1205 Pendleton St, Rm 246 Columbia SC 29201-3790 Phone:803-734-0130; Fax: 803-734-1042

Table 5-3: FUNDING MECHANISM SUMMARY

Organization	Program	Purpose & Limitations of Funds	Potential Funding	Timeline	Contact Information
					rpratt@scprt.com
	Community Development Block Grant	CDBG funds are related to low- and moderate-income areas for housing, economic opportunities and human living environment projects which are not ideal project profiles for stormwater projects.	varies	varies	http://www.hud.gov/offices/cpd/communitydevelopment/programs/statead min/ Ms. Bonnie Ammons, Senior Program Manager State of South Carolina Office of Community Grant Programs 1201 Main St. Suite 1600 Columbia, SC 29201 Phone: (803) 734-1399 bammons@sccommerce.com
	Parks and Recreation Development Grant	This grant is intended to address conserving freshwater fish, aquatic organisms, and their habitats; water flows, climate change and adaption; and imperiled fish			
	Community Assistance Grant utilizing Coastal Non-Point Program administered by Ocean and Coastal Resource Management (OCRM)				
	Environmental Education grants				

Table 5-3: FUNDING MECHANISM SUMMARY

Organization	Program	Purpose & Limitations of Funds	Potential Funding	Timeline	Contact Information
SC Department of Transportation (DOT)					
SC Department of Natural Resources (DNR)					
State Emergency Management Division (EMD)					
US Department of Housing and Development (HUD)	Community Development Block Grant	CDBG funds are related to low- and moderate-income areas for housing, economic opportunities and human living environment projects which are not ideal project profiles for stormwater projects.	varies	varies	http://www.hud.gov/offices/cpd/communitydevelopment/programs/stateadmin/ Ms. Bonnie Ammons, Senior Program Manager State of South Carolina Office of Community Grant Programs 1201 Main St. Suite 1600 Columbia, SC 29201 Phone: (803) 734-1399 bammons@sccommerce.com
US Environmental Protection Agency (EPA)	EPA Wetland Program Development Grant	This grant provides financial assistance for wetland protection, restoration and enhancement. Numerous non-point source projects would be applicable to this grant, including installation of BMPs on a	EPA awards approximately 6 – 13 projects nationwide annually for $50,000 - $200,000; 75/25 match	Proposal deadline is typically in October.	http://water.epa.gov/grants_funding/wetlands/grantguidelines/index.cfm Region 4 (AL, FL, GA, KY, MS, NC, SC, TN) Morgan Jackson US EPA Region 4 61 Forsyth Street, SW Atlanta, GA 30303

Table 5-3: FUNDING MECHANISM SUMMARY

Organization	Program	Purpose & Limitations of Funds	Potential Funding	Timeline	Contact Information
		variety of surface waters.			Phone: 404-562-9323 jackson.morgan@epa.gov
	Regional Environmental Priority Project (REPP)				
US Army Corps of Engineers (USACE)					
US Coast Guard (USCG)					
National Oceanic and Atmospheric Administration (NOAA)	NOAA Formal Environmental Literacy Grant				
	National Marine Fisheries Service (MNFS); sub-agency of NOAA				
US Geological Survey (USGS)					
US Department of Agriculture (USDA)	Conservation Reserve Program (CRP)				
	Conservation Reserve Enhancement Program (CREP)				
	Environmental Quality Incentives Program (EQIP)	Available to farming community for conservation planning and BMP installation. Any farmer engaged in forestry, livestock or crop production on eligible land may apply for EQIP.	75/25 match	Continuous signup; ranking of applications in April	Beaufort County NRCS 817 Parris Ave. Mail: PO Box 70 Port Royal, SC 29935 Phone: (843) 522-8100/Fax: (843) 522-0585 bswcd@islc.net
	NRCS Conservation Innovation Grant (CIG)	Water Resources is one of the CIG categories offered in South Carolina.	Individual grants not to exceed $75,000;	Pre-proposals due in December. If	Beaufort County NRCS 817 Parris Ave. Mail: PO Box 70

Table 5-3: FUNDING MECHANISM SUMMARY

Organization	Program	Purpose & Limitations of Funds	Potential Funding	Timeline	Contact Information
		Numerous non-point source projects would be applicable to this grant, utilizing innovative technologies or approaches. CIG will fund single and multi-year projects, not to exceed 3 years.	50/50 match.	your pre-proposal is selected, a full proposal is due in March.	Port Royal, SC 29935 Phone: (843) 522-8100/Fax: (843) 522-0585 bswcd@islc.net
	Forest Incentive Program (FIP)				
	Land Water Conservation Fund (LWCF)	This grant provides funds for acquisition or development of land for public outdoor recreational use purposes.			
	Watershed and River Basin Planning and Installation Public Law 83-566 (PL566)				
	Wildlife Habitat Incentive Program (WHIP)				
	Wetland Reserve Program (WRP)				
US Fish and Wildlife Service (USFWS)	Private Stewardship Program				
	Conservation Grants				
	Keystone Initiative Grant				
	Five Star Restoration Matching Grant	Financial assistance is provided to support wetland, riparian and coastal habitat restoration	$10,000 to $40,000, with $20,000 avg; 1:1 match	Proposal due around mid-February	www.nfwf.org/fivestar Carrie Clingan cclingan@naco.org National Association of

Table 5-3: FUNDING MECHANISM SUMMARY

Organization	Program	Purpose & Limitations of Funds	Potential Funding	Timeline	Contact Information
		projects. 5 organizational partners are required.			Counties (202) 942-4246 Lacy Alison National Fish and Wildlife Foundation (202) 857-0166 Lacy.Alison@nfwf.org
	Boating Access Grant, funded as part of Sport Fish Restoration Act				
	Coastal Program Grant				
Federal Highway Administration	Federal Highway Administration Recreational Trails Program Grant				
National Park Service	National Park Service Rivers Trails and Conservation	This program is not a grant but it provides assistance for finding funding to help conserve rivers, establish trails and provide outdoor recreational opportunities.			
	Land & Water Conservation Fund (LWCF)	LWCF is a federally funded grant program for the acquisition and development of outdoor recreation areas. To be eligible for LWCF grants, projects must be included in the statewide	Letter of Intent due around December 7. LWCF proposal due around March 23.	$25,000 - $250,000 per project; 50/50 match	http://www.nps.gov/ncrc/programs/lwcf/fed_state.html http://www.sctrails.net/trails/TRAILSPROGRAM/GRANTS/grants.html Tony Bebber, Planning Manager

Table 5-3: FUNDING MECHANISM SUMMARY

Organization	Program	Purpose & Limitations of Funds	Potential Funding	Timeline	Contact Information
		recreation plan (sometimes called a SCORP).			Department of Parks, Recreation and Tourism 1205 Pendleton Street Columbia, SC 29201 Tel: 803-734-0189 tbebber@scprt.com
National Science Foundation	Geo Education Grant				
	Ecosystem Science Grant				
	Environmental Sustainability Grants	This grant supports engineering research which supports human well-being and sustaining environmental systems.			
	Hydrologic Sciences Grants	This grant supports the study of the flow of water and transport processes within streams, soils and aquifers.			
Department of Homeland Security	Grant Program to enhance on-water law enforcement				
Non-governmental Organization Funding	Land Trust Alliance Watershed Protection Collaborative Planning Demonstration Projects Grants	This grant helps land trusts develop alliances to devise conservation plans.			
	South Carolina Conservation Bank Grant				
	Lowe's Outdoor Classroom Grant Program				
	NEA Foundation Student				

Table 5-3: FUNDING MECHANISM SUMMARY

Organization	Program	Purpose & Limitations of Funds	Potential Funding	Timeline	Contact Information
	Achievement Grants				
	Captain Planet Foundation				
	Community Foundation of the Lowcountry				
	SCE&G Community Development Grant	This Grant provides funding to help South Carolina communities build infrastructure that helps businesses succeed including site preparation, extension of water and sewer lines, highway construction and other public works.			

For the short and medium-term, the Town should focus on the funding mechanisms that are currently in place and the ones that have been successful in the past. The Town should continue to successfully execute and pursue grants and other funding that have been successfully rewarded and supported. The Town should continue to foster relationships with federal, state, and local organizations and partners with whom the Town has successfully completed projects.

Funding mechanisms, both new and previously successful opportunities, should be identified and prioritized as high, medium, and low priority based on the value provided to the Town and the feasibility of implementation. The following criteria should be considered when prioritizing funding mechanisms:

- ✓ If funds can support a project that has already been identified/planned by the Town
- ✓ Limitations of mechanism (e.g. projects must involve students)
- ✓ Available funding provided by mechanism
- ✓ Effort required to attain funding (e.g. grant application)
  - ❖ Complexity of application (i.e. data/information requirements)
  - ❖ Estimated amount of effort (e.g. labor hours) required to complete application
  - ❖ Deadline date and competing efforts during that time frame
  - ❖ Authorization requirements (e.g. internal approval, Council approval)
- ✓ Probability of being awarded funding (based on available funding, ratio of applications to awarded projects, feedback from point of contact on preference for types of projects)
- ✓ Funding commitment (i.e. matching funds) required from the Town should the application be approved
- ✓ Schedule commitment required from the Town should the application be approved and competing efforts during that time frame
- ✓ Partnering opportunities (e.g. state agencies, other municipalities, private businesses, private property owners)
- ✓ Local public/private support for the projects and funding mechanism
- ✓ Political support for the projects and funding mechanism

5.3.2 Matrix of Funding Opportunities

An effective formula for success in pursuing and attaining funding mechanisms is to proactively identify potential projects that have value to the Town and then identify which mechanisms can support these projects. This section recommends funding mechanisms, as identified in Section 5.3.1, - Funding Mechanisms, that best support the projects identified in the Action Plan. The intent of this and the previous section is to assist the Town's decision process for which mechanisms (i.e. taxes, grants, loans, partnerships) to pursue for which potential projects.

To provide the maximum benefit for funding the recommended projects and actions, this Action Plan will capitalize on existing programs, funding, partnerships, and alternative funding sources

for short-term projects and then expand to potential new funding mechanisms for medium- and long-term projects.

Table 5.4: Potential Funding Mechanism

Project Name	Potential Funding Mechanism					
	Municipal / Regional Programs and Funds	Local Authorities / Opportunities	State Authorities / Opportunities	Federal Authorities / Opportunities	Non-Governmental / Non-Profit Organization	Private Partnering (funds or in-kind services)
BMP Project Recommendations						
Area L– Construct New Stormwater Ponds	✓	✓	✓	✓		✓
Area A – Construct New Stormwater Ponds and Modify Existing Pond	✓	✓	✓	✓		✓
Area C – Construct New Stormwater Pond	✓	✓	✓	✓		✓
Area J – Construct New Stormwater Pond / Modify Existing Pond	✓	✓	✓	✓		
Area D – Construct Earthen Ditch Blocks	✓	✓	✓	✓	✓	✓
Area E - Construct Earthen Ditch Blocks	✓	✓	✓	✓	✓	✓
Area N - Construct Earthen Ditch Blocks	✓	✓	✓	✓	✓	✓
Area B – Construct New Stormwater Pond	✓	✓	✓	✓		✓
Area F – Modify Existing Stormwater Ponds	✓	✓	✓	✓		✓
Area G – Modify Existing Stormwater Pond	✓	✓	✓	✓		✓
Area AG – Construct New Stormwater Pond	✓	✓	✓	✓		✓
Area H – Modify Existing Stormwater	✓	✓	✓	✓		✓

Table 5.4: Potential Funding Mechanism

Project Name	Potential Funding Mechanism					
	Municipal / Regional Programs and Funds	Local Authorities / Opportunities	State Authorities / Opportunities	Federal Authorities / Opportunities	Non-Governmental / Non-Profit Organization	Private Partnering (funds or in-kind services)
Ponds						
Area I - Modify Existing Stormwater Ponds	✓	✓	✓	✓		
Area M - Modify Existing Stormwater Ponds	✓	✓	✓	✓		✓
Area K - Modify Existing Stormwater Ponds	✓	✓	✓	✓		✓
Area AF – Install Earthen Ditch Blocks	✓	✓	✓	✓	✓	✓
Septic Programs / Projects						
Septic Policy/ Ordinance Development		✓	✓	✓		
Property Owner Association Covenants, Codes, Restrictions Development		✓				✓
Septic Survey and Analysis to better understand loadings		✓	✓	✓		
Septic Inspection/Maintenance Program		✓				
Septic System Cleaning Incentive Program		✓				
Septic System Education Program		✓			✓	
Septic System		✓				

Table 5.4: Potential Funding Mechanism

Project Name	Potential Funding Mechanism					
	Municipal / Regional Programs and Funds	Local Authorities / Opportunities	State Authorities / Opportunities	Federal Authorities / Opportunities	Non-Governmental / Non-Profit Organization	Private Partnering (funds or in-kind services)
Management Plan						
Connect Septic Areas to Sewer		✓				
Septic Retrofits		✓	✓	✓		
Wildlife Management/Domestic Animal Programs / Projects						
Implement Pet waste stations		✓			✓	✓
Expand forested buffers to act as runoff filter		✓	✓			
Public education campaign to reduce food sources for wildlife in developed areas		✓			✓	✓
Physical barriers for wildlife from waterbodies	✓	✓			✓	
Hunting/culling		✓			✓	✓
Varying / Ordinance Programs and Projects						
Public Education		✓			✓	✓
Unified Development Ordinance Amendments		✓				
Development Agreements/ Transfer of Development Rights/ Incentives Programs		✓			✓	✓
Promotion of Individual Homeowner BMPs		✓			✓	✓
(Solar) Aerators for		✓			✓	✓

Table 5.4: Potential Funding Mechanism

Project Name	Potential Funding Mechanism					
	Municipal / Regional Programs and Funds	Local Authorities / Opportunities	State Authorities / Opportunities	Federal Authorities / Opportunities	Non-Governmental / Non-Profit Organization	Private Partnering (funds or in-kind services)
man-made ponds						
Horse Manure Management & BMPs		✓			✓	✓
Town of Bluffton Planned Project Stormwater Implementation						
Converting Septic Service to Sewer Service		✓				
Implement pervious surfaces (i.e. on roadways, sidewalks and parking lots)		✓	✓			
Increase Education through Communication and Marketing to make citizens aware of the Town's goals, including water quality		✓			✓	✓
Implement Runoff Reduction Techniques in New Projects		✓				
Incorporate landscaped medians that have a dual use for bioretention/detention on roadway/streetscape projects		✓			✓	✓

5.4 Administration

The May River Watershed Action Plan will only be successful when the management entities understand limits, expectations, duties and responsibilities. This section of the Action Plan lays out roles and establishes a commitment schedule for implementation.

The following potential responsible parties have been identified with corresponding potential responsibilities, so the Town can develop a schedule of committed partner actions, as appropriate for implemented projects. Partnering is a critical element of this Action Plan, and has been responsible for much of the progress that the Town has made to date for the May River. All of the project and program types (public, public-private and private) require partnering to some extent, whether it be land acquisition/access, funding or in-kind services, or general support to commit Town funds.

Below is a general matrix that matches partner types (and specific entities) with potential responsibilities. A more detailed matrix is expanded to match specific project locations and tactics (BMPs) with partners is provided later in this section; which also notes the specific tasks and documentation tools that will be required for a given partner and project.

Table 5-5: Potential Partners

Category	Specific Organizations	Potential Responsibilities

Local Government	• Beaufort County
	  ○ Stormwater Management
	  ○ Public Works
	  ○ Keep Beaufort County Beautiful
	• Town of Bluffton
	  ○ Planning & Environmental Sustainability
	  ○ Engineering
	• Soil & Water Conservation District
		• Funding
		• Provide land
		• Regulatory
		• Monitoring
		• Action Plan development & implementation
		• BMP/retrofit project management
		• BMP Maintenance
		• Education Program implementation
		• Monitoring

Regional	• Beaufort Jasper Water Utility Authority • Palmetto Electric Cooperative • South Carolina Electric and Gas	• Monitoring • Action Plan implementation • Public outreach
Private	• Developers • Property Owners • Local Businesses	• Funding • Land donation or agreement • Public access • BMP Maintenance

Table 5-5: Potential Partners		
Category	**Specific Organizations**	**Potential Responsibilities**
		• Education Program implementation • Donate supplies or equipment
Non-profit organizations	• Friends of the River • Bluffton Rotary Club • Beaufort County Open Land Trust • Port Royal Sound Foundation • Coastal Conservation League • Clemson University • University of South Carolina	• Public outreach • Education Program support • In-kind services (monitoring, BMP installation & maintenance)
State	• Department of Natural Resources • Department of Health and Environmental Control • Department of Transportation	• Technical Support and Assistance
Federal	• Army Corp of Engineers • Environmental Protection Agency • National Oceanic and Atmospheric Administration • USGS	• Technical Support and Assistance

For each specific project, the responsibility parties should be identified during the feasibility study. Agreements, policies, and procedures need to be prepared before implementing the project that outline who are the responsible parties and what are their responsibilities, both medium- and long-term. Responsibilities may include: financial obligations, land donation, access agreements, and maintenance requirements.

These administrative efforts should be fully addressed during the feasibility study (or relevant phase of implementation). Before implementing the project agreements, it is recommended that the Town have already specified the policies, and procedures need to be prepared. The information in the preceding table is recommended to serve as a starting point, and should be modified as needed over the Long-term.

Below is a detailed series of matrices that provide an expanded list of potential responsibilities for each project area and project type, which the Town should consider adopting as part of this Action Plan.

Table 5-6: Potential Responsibilities for Each Project Area and Project Type

Oscar Frazier Community Park

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Pet Waste Management	Town	• Provide land & pet waste stations • Funding • Maintenance	• Maintenance Agreement; Contract for waste disposal
	Local Businesses (e.g. pet supply companies; pet services)	• Donate supplies • Funding	• Voluntary; • Written agreement • Can allow advertising on the pet waste signs in exchange for supplying the pet waste station)
	Non-profit organizations (e.g. schools, scouts)	• Education/Marketing campaign	• Voluntary; • Written agreement
	Pet owner groups	• Social marketing campaign	• Voluntary; • Written agreement
Rain gardens	Town	• Provide land • Funding • Maintenance	• Maintenance Agreement
	Local Businesses (e.g. landscaping companies, nurseries, home improvement stores)	• Donate supplies & services • Funding	• Voluntary; • Written agreement • Can allow advertising on signs within the rain gardens saying who provided/donated the supplies/land in exchange for the donation
	Non-profit organizations (e.g. garden club, scouts)	• Gardening services; • Education/Marketing campaign	• Voluntary; • Written agreement
Pervious pavement	Town	• Provide land • Funding • Maintenance	• Maintenance Agreement
	Local Businesses (e.g. landscaping	• Donate supplies & services • Funding	• Voluntary; • Written agreement

Table 5-6: Potential Responsibilities for Each Project Area and Project Type

Oscar Frazier Community Park

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
	companies, home improvement stores)		• Can post a sign stating who provided materials/donations to allow for the pervious pavement in exchange for providing the services/materials

Pilot Project (Stoney Creek): Regional Pond with sand filter

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Regional Pond with sand filters	County & Town	• Provide land • Funding • Construction Management • Maintenance	• Intergovernment agreement • Maintenance Agreement
	Private Property Owner	• Provide land • Maintenance	• Deed • Maintenance Agreement
	Home Owners Association	• Education/Marketing campaign	• Materials / Sign In Sheets

More Recent Residential Development:
The Farm at Buckwalter; Hampton Hall; Hampton Lakes

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Pond retrofit	County & Town	• Provide land • Funding • Construction Management • Maintenance	• Intergovernment agreement • Maintenance Agreement

More Recent Residential Development:
The Farm at Buckwalter; Hampton Hall; Hampton Lakes

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
		• Incentives for developers	
	Developers	• Provide land • Funding • Design services • Construction services • Maintenance	• Deed • Maintenance Agreement
	Private Property Owners	• Provide land • Maintenance	• Deed • Maintenance Agreement
	Home Owners Association	• Provide land • Maintenance • Education/Marketing campaign	• Deed • Maintenance Agreement
Wildlife controls	County & Town	• Education/Marketing campaign • Funding	• Policy/Ordinance
	SCDNR	• Social marketing/ education campaign • Consult with Town	• Intergovernment agreement
	Local Businesses (e.g. outdoorsmen stores, meat processors)	• Donate supplies & services • Provide discounts to participants • Funding • Social marketing campaign	• Voluntary; • Written agreement
	Non-profit organizations (e.g. Hunting for the Hungry)	• Social marketing campaign • Donate services	• Voluntary; • Written agreement
Rainwater Harvesting	County & Town	• Provide land • Funding • Maintenance • Incentives for developers & property owners	• Intergovernment agreement • Maintenance Agreement
	Developers	• Provide land • Funding • Design services	• Deed • Maintenance Agreement

More Recent Residential Development:
The Farm at Buckwalter; Hampton Hall; Hampton Lakes

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
		• Construction services • Maintenance	
	Private Property Owners	• Provide land • Maintenance • Social marketing campaign	• Deed • Maintenance Agreement
	Home Owners Association	• Provide land • Maintenance • Social marketing campaign	• Deed • Maintenance Agreement

Older Residential Development:
Rose Dhu Creek Plantation; Gascoigne Bluff

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Wildlife controls	County & Town	• Education/Marketing campaign • Funding	• Policy/Ordinance
	SCDNR	• Education/Marketing campaign • Consult with Town	• Intergovernment agreement
	Local Businesses (e.g. outdoorsmen stores, meat processors)	• Donate supplies & services • Provide discounts to participants • Funding • Social marketing campaign	• Voluntary; • Written agreement
	Non-profit organizations (e.g. Hunting for the Hungry)	• Education/Marketing campaign • Donate services	• Voluntary; • Written agreement
Septic Programs	County & Town	• Funding or cost-share • Inspections	• Ordinance/Policy

Older Residential Development:
Rose Dhu Creek Plantation; Gascoigne Bluff

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
		• Incentives for property owners	
	Private Property Owners	• Funding • Maintenance • Social marketing campaign	• Ordinance/Policy
	Home Owners Association	• Funding • Maintenance • Education/Marketing campaign	• Ordinance/Policy
	Local Businesses (e.g. septic installation & services companies)	• Donate supplies & services • Provide discounts to participants • Funding • Education/Marketing campaign	• Voluntary; • Written agreement
	BJWSA	• Run sanitary sewer to area • Funding or cost-share for connection from house to sanitary sewer	• Written agreement
Rainwater Harvesting	County & Town	• Provide land • Funding • Maintenance • Incentives for developers & property owners	• Intergovernment agreement • Maintenance Agreement
	Private Property Owners	• Provide land • Maintenance • Social Marketing campaign	• Deed • Maintenance Agreement
	Home Owners Association	• Provide land • Maintenance • Education/Marketing campaign	• Deed • Maintenance Agreement

Older Residential Development:
Rose Dhu Creek Plantation; Gascoigne Bluff

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Regional Ponds	County & Town	• Provide land • Funding • Construction Management • Maintenance • Incentives for developers	• Intergovernment agreement • Maintenance Agreement
	Private Property Owners	• Provide land • Maintenance	• Deed • Maintenance Agreement
	Home Owners Association	• Provide land • Maintenance • Education/Marketing campaign	• Deed • Maintenance Agreement
Retrofit Ditches	County & Town	• Provide land • Funding • Construction Management • Maintenance • Incentives for developers	• Intergovernment agreement • Maintenance Agreement
	Private Property Owners	• Provide land • Maintenance	• Deed • Maintenance Agreement
	Home Owners Association	• Provide land • Maintenance • Education/Marketing campaign	• Deed • Maintenance Agreement
End-of-pipe retrofits	County & Town	• Funding (design, construction, & maintenance) • Construction Management • Maintenance	• Intergovernmental agreement • Maintenance Agreement
	SCDOT	• Funding (design, construction, & maintenance) • Maintenance	• Intergovernmental agreement • Maintenance Agreement

Largely Undeveloped Area: Palmetto Bluff

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Wildlife controls	County & Town	• Education/Marketing campaign • Funding	• Policy/Ordinance
	SCDNR	• Education/Marketing campaign • Consult with Town	• Intergovernmental agreement
	Local Businesses (e.g. outdoorsmen stores, meat processors)	• Donate supplies & services • Provide discounts to participants • Funding • Education/Marketing campaign	• Voluntary; • Written agreement
	Non-profit organizations (e.g. Hunting for the Hungry)	• Education/Marketing campaign • Donate services	• Voluntary; • Written agreement
Wetland Retrofit	County & Town	• Provide land • Funding (design, construction, & maintenance) • Construction Management • Maintenance • Incentives for developers	• Intergovernmental agreement • Maintenance Agreement
	Corps of Engineers	• Permitting	• Permit
	Developers	• Provide land • Funding • Design services • Construction services • Maintenance	• Deed • Maintenance Agreement
	Private Property Owners	• Provide land • Maintenance	• Deed • Maintenance Agreement

Town & County Facilities:
Town Hall, schools, library, fire department, parks

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Rain gardens	County & Town	• Provide land • Funding (design, construction, & maintenance) • Maintenance	• Maintenance Agreement
	Local Businesses (e.g. landscaping companies, nurseries, home improvement stores)	• Donate supplies & services • Funding	• Voluntary; • Written agreement
	Non-profit organizations (e.g. garden club, scouts)	• Gardening services; • Education/Marketing campaign	• Voluntary; • Written agreement
Rain barrels & cistern	County & Town	• Provide land • Funding (design, construction, & maintenance) • Maintenance	• Maintenance Agreement
	Local Businesses (e.g. landscaping companies, nurseries, home improvement stores)	• Donate supplies & services • Funding	• Voluntary; • Written agreement
Pervious pavement	County & Town	• Provide land • Funding (design, construction, & maintenance) • Maintenance	• Maintenance Agreement
	Local Businesses (e.g. landscaping companies, home improvement stores)	• Donate supplies & services • Funding	• Voluntary; • Written agreement

Town & County Facilities:
Town Hall, schools, library, fire department, parks

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Disconnect rain downspouts from storm drains	County & Town	• Funding (design, construction, & maintenance) • Maintenance	• Maintenance Agreement
	Local Businesses (e.g. landscaping companies, nurseries, home improvement stores)	• Donate supplies & services • Funding	• Voluntary; • Written agreement

Road BMPs (partner with DOT)

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Retrofit medians and swales to increase perviousness	County & Town	• Provide land • Funding (design, construction, & maintenance) • Maintenance	• Intergovernment agreement • Maintenance Agreement
	SCDOT	• Provide land • Funding (design, construction, & maintenance) • Maintenance	• Intergovernment agreement • Maintenance Agreement
	Local Businesses (e.g. landscaping companies, nurseries, home improvement stores)	• Donate supplies & services • Funding	• Voluntary; • Written agreement
	Non-profit organizations (e.g. garden club, scouts, local artists, Keep Beaufort County Beautiful, Adopt-A-	• Gardening services; • Education/Marketing campaign	• Voluntary; • Written agreement

Road BMPs (partner with DOT)

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
	Highway)	• Beautification • Maintenance	

Current Town's Planned Projects FY 2012

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
General	Non-Stormwater Department (Parks, Trans.)	• Affirm budget suitability • Affirm primary function will not be jeopardized	• Internal memoranda, or other standard Town communication
	Stormwater Management Staff	• Approve water quality design component(s) • Identify operation and maintenance needs	
Pathways Bruin Road Land Acquisition	Public Works / Environmental / Utility Departments	• Use alternative parking surfaces • Promote greener project elements; transfer to other projects • Coordinate with sensitive areas and retrofitting • Use runoff reduction techniques use as outreach tool. • Continue to minimize septic tanks monitoring	• Internal Memos
Bluffton Park Nature Trail	Planning Department	• Use interpretive signs/guides to support communication	• Internal Memos
Field of Dreams (Rotary Field)	Planning Department / Parks and Recreation	• Increase LID aspects of project (parking areas). • Support communication and marketing	• Internal Memos • Maintenance Agreements
Wharf Street Redevelopment / Affordable Housing	Planning Department / Marketing	• Illustrate how others can do this as private initiative	• Internal Memos

Recommended BMP Projects

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Area L– Construct New Stormwater Ponds	Private Property Owners	• Provide land • Maintenance	• Deed • Maintenance Agreement
Area A – Construct New Stormwater Ponds and Modify Existing Pond	Private Property Owners	• Provide land • Maintenance	• Deed • Maintenance Agreement
Area C – Construct New Stormwater Pond	Private Property Owners	• Provide land • Maintenance	• Deed • Maintenance Agreement
Area J – Construct New Stormwater Pond / Modify Existing Pond	Town	• Funding • Maintenance	• Intergovernment agreement • Maintenance Agreement
Area D – Modify Existing Ditch to Divert Water Through Existing Stormwater Ponds	Private Property Owners	• Provide land/Easement • Maintenance	• Deed • Maintenance Agreement
Area E - Construct Earthen Ditch Blocks	Private Property Owners	• Provide land/Easement • Maintenance	• Deed • Maintenance Agreement
Area N - Construct Earthen Ditch Blocks	Private Property Owners	• Provide land/Easement • Maintenance	• Deed • Maintenance Agreement
Area B – Construct New Stormwater Pond	Private Property Owners	• Provide land • Maintenance	• Deed • Maintenance Agreement
Area F – Modify Existing Stormwater Ponds	Private Property Owners	• Provide easement • Maintenance	• Deed • Maintenance Agreement
Area G – Modify Existing Stormwater Pond	Private Property Owners	• Provide easement • Maintenance	• Deed • Maintenance Agreement
Area H – Modify Existing Stormwater Ponds	Private Property Owners	• Provide easement • Maintenance	• Deed • Maintenance Agreement
Area I - Modify Existing Stormwater Ponds	Town / County	• Funding • Maintenance	• Intergovernment agreement • Maintenance Agreement
Area M - Modify Existing Stormwater Ponds	Private Property Owners	• Provide easement • Maintenance	• Deed • Maintenance Agreement
Area K - Modify Existing Stormwater Ponds	Private Property Owners	• Provide easement • Maintenance	• Deed • Maintenance Agreement

Septic Tank Program Elements

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Septic Policy/ Ordinance	Planning Department / Utilities Department / Beaufort County	• Policy review/ adoption • Policy enforcement	• Updated policies • Intergovernment Agreement
Property Owner Association Covenants, Codes, Restrictions relating to Septic Systems	Private HOAs / Planning Department / Beaufort County	• Policy review /adoption • Policy enforcement	• Updated policies
Survey and Analysis of septic - understand contribution of septic systems	Public Works – Survey	• Survey services	• Internal memos
Septic Inspection and Maintenance Program	Public Works / Beaufort County	• Inspections • On-going maintenance	• Intergovernmental Agreement
Septic System Cleaning Incentive Program	Private land owners / Planning Department / Beaufort County	• Policy review • Provide incentives	• Updated policies • Intergovernment Agreement
Septic System Education Program	Planning Department / Beaufort County	• Public Outreach • Social Marketing	• Internal memos • Intergovernment Agreement
Septic System Management Plan	Beaufort County	• Plan/Policy review • Code enforcement	• Intergovernment Agreement
Connect septic Areas to Sewer	Public Works / Beaufort County	• Field connections • Planning / modeling for capacity	• Internal memos • Intergovernment Agreement
Septic Retrofits	Public Works / Beaufort County	• Field retrofits and inspections	• Internal memos • Intergovernment Agreement

Wildlife/Domestic Animal Program Elements

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Pet pickups	HOAs / Private Land Owners / Beaufort County	• Install pickup stations • Maintenance • Social Marketing	• Written Agreement for Maintenance

Wildlife/Domestic Animal Program Elements

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Expand forested buffers to act as runoff filter	Beaufort County / Private Land Owners	• Land donation / easement • Policy review / adoption • Policy enforcement	• Policy updates
Public education campaign to reduce wildlife food sources (e.g., trash cans, dog food, feeding wildlife)	Planning Department / Beaufort County	• Mailings / Flyers • Social Marketing	• Written documentation / Internal Memos
Physical barriers from waterbodies (e.g., fences and string)	Public Works / Private Land Owners	• Landowner Consent • Field installation	• Written documentation
Re-introduction of predators of problem species	Third Party	• Wildlife Survey • Analysis of existing wildlife vs. predators	• Written documentation • Monitoring of species types and locations
Hunting/culling	Third Party / Citizens	• Wildlife Survey • Hunting, if deemed appropriate	• Written documentation • Enforcement of hunting boundaries • Hunting Permit enforcement
Wildlife Corridors	Private land owners / HOAs	• Land donation/easement • Policy review/adoption	• Proof of land sales / written documentation of easement

Varying Program Elements

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Education	Planning Department / Beaufort County	• Public Outreach • Information sessions • Mailings / Flyers	• Written documentation • Internal memos
Unified Development Ordinance Amendments	Planning Department / Beaufort County	• Review policy • Update and adopt new policies	• Internal memos • Intergovernmental Agreement
Development Agreements/ Incentives/Transfer of Development Rights Program	Beaufort County / Non-profit groups	• In-kind Services and donations • Incentive funding	• Written documentation • Policy updates

Varying Program Elements

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Individual homeowner BMPs	Private Land Owners / Citizens	• Installation • Maintenance	• Internal Memos
(Solar) Aerators for man-made ponds	HOAs / Private Land Owners	• Installation • Maintenance	• Written Documentation
Horse Manure Management & BMPs	Beaufort County / Parks and Recreation Department / Town	• Maintenance • Enforcement • Social Marketing	• Written Documentation

Hydrology Program Elements

Type of Project	Potential Responsible Parties/Partners	Responsibility	Recommended Documentation of Responsibility
Stormwater Harvesting	Private Land Owners / HOAs	• Installation • Maintenance • On-going usages	• Written documentation
Reuse / Purple Pipe	Utility Department / Beaufort County	• Analysis • Installation • Maintenance	• Intergovernment Agreement • Permitting documents
Constructed Wetlands / Retrofitted Wetland Systems	Beaufort County / Private Land Owners	• Provide Land	• Written Documentation • Permitting documents

As partners (particular groups and explicit points of contact) will change over time, the Town should use this Section as a general work plan to follow annually, and develop a companion document that lists specific contacts and their key information (phone, address, e-mail, etc.).

It is also important to note that the long-term goals of the project is to use private projects, such as removing septic tanks from the list of potential sources of bacteria, so that a greater emphasis can be placed on maintaining/restoring the natural hydrology volume to the maximum extent technically feasible. Both will require significant partnering and coordination. Therefore, the public projects will become a forum to demonstrate new behaviors and techniques that homeowners and developers can become familiar with and efficient, allowing for their adoption at an earlier and more rapid rate with minimized Town interaction. Public-private projects are intended to serve as the transitional element as incentives (cost-sharing) will increase the learning curve of the resident and development communities, while offering the Town additional sources of funding (i.e. grants).

Furthermore, while some of the actions noted above are also listed as an Immediate Implementation Strategy, they need to be sustained for the long-term to make this Action Plan successful in meeting the stated goals.

6.0 Summary and Next Steps

Below is a summary of the next steps to be taken by the Town, to implement this Action Plan. The "Next Steps" are primarily the short-term actions listed throughout this document, although some include general discussions needed to address potential long-term goals. They are listed by category, and items of **highest priority** have been identified in **bold font**.

Targeted Project/Retrofit Options

- ✓ **Existing town planned projects**
- ✓ **New priority BMP concepts**
- ✓ Develop a weight value for each project prioritization criteria.

Town Policy, Design/Zoning Standards and Ordinance Assessment

- ✓ **Continue addressing goals of the Town Comprehensive Plan**
- ✓ **Enforce requirements of UDO and Town Stormwater Design Manual**
- ✓ **Develop a formal land acquisition and develop more aggressive Transfer of Development Rights strategy**
  - ❖ **Regarding TDR, the Town should target lands which have an approved planned development in place. A review of their permit sunset/expiration dates or permit triggers that would allow for renegotiation would provide the Town direction on which developers to pursue first.**
  - ❖ **A modified land acquisition strategy could also include performing a review of defaulted/vacant properties within the watershed that could be acquired and utilized as stormwater buffers.**
- ✓ **Perform a formal, detailed review of the existing ordinances/stormwater plan using the CWP Tools**. This will be a more detailed review than the inventory review that was provided with this effort, and will return a specific picture of the current watershed. Priority items include:
  - ❖ Develop a septic system ordinance addressing long-term maintenance.
  - ❖ Required temporal disturbance to regulate the amount of time a site can sit after clearing before meeting construction milestones.
  - ❖ Require septic design standards to address water quality standards.
- ✓ Utilize EMC loading rates in the County Manual for Stormwater BMPs (see Additional Studies).
- ✓ Implement a tracking system of on-site LID practices.
- ✓ Incorporate significant incentives into ordinances (reduced fees or expedited reviews).
- ✓ Consider adding the Aquatic Protection standard, as described in the CSS
- ✓ Discuss the preparation of a sewer ordinance if establishing more Town sewers in septic areas is desired.
- ✓ Discuss sewer policies for current septic systems (upgrading vs. converting to sewer)

Additional Studies

- ✓ **Complete the flow determination for sub-basin delineation.**

- ✓ **Develop a wash-off water quality model (i.e. spreadsheet approach) that can utilize the EMC loading rates for the varying land uses (County Manual for Stormwater BMPs) and for areas served by septic tanks (CWP).**
- ✓ Conduct a survey of septic-users in the watershed
- ✓ Begin discussion on the long-term dynamic modeling.
- ✓ Investigate the value of a wildlife survey, based on local experiences.
- ✓ Determine the cost for more-detailed watershed monitoring (rainfall and flow)

DNR Sampling Recommendations

- ✓ **Discontinue the existing continuous data sonde program**
- ✓ **Continue to collect data routinely at main stem river stations after repositioning**
- ✓ **Monitor the most critical parameters in the headwaters of developed sub-watersheds**
  - At least three undeveloped drainages on Palmetto Bluff
  - Discontinue monitoring at most Palmetto Bluff Golf Course stations
  - Sample headwater and creek mouths for dry and rain events
- ✓ **Improve quality assurance/quality control (consistency) of data collection**
- ✓ **Structure monitoring and research around clear and focused questions.**

Financial Analyses, Responsible Parties & Partnering Opportunities

- ✓ **Identify Action Plan elements to be implemented through other Town actions**.
  - ❖ **Record projects that offer water quality benefits and list their quantified value.**
- ✓ **Continue to pursue grants and other funding.**
- ✓ **Explore partnering and in-kind service agreements.**
  - ❖ Identified project-specific responsibilities during the feasibility study.
  - ❖ Developing a companion document with key information (phone, address, e-mail, etc
  - ❖ Continually record revenues and valued services collected from partnerships,
- ✓ **Prioritize funding mechanisms as high, medium, and low priority**
- ✓ **Annual budgets should be developed to include one to two typical Town projects per year.**

Communication and Marketing

- ✓ **Use lessons learned from the current social marketing campaign (319 Program project)**
- ✓ **Seeking lessons to be learned from other coastal communities**
- ✓ **Utilize additional, broad methods to collect and distribute information:**
  - ❖ Educational workshops
  - ❖ Stormwater Hotline/Help Line
  - ❖ E-mail newsletter and notices

Referenced Publications

AMEC Earth and Environmental, Center for Watershed Protection, Debo and Associates, Jordan Jones and Goulding, & Atlanta Regional Commission, August 2001. Georgia Stormwater Management Manual, First Edition; Available online at: http://www.georgiastormwater.com/

B.P. Barber. 2007. Town of Bluffton May River monitoring program: stormwater sampling study. Prepared for Town of Bluffton, Bluffton, SC.

Center for Watershed Protection (CWP) & Chatham County MPC, 2008. Aquatic Protection Criteria of the Coastal Stormwater Supplement to the Georgia Stormwater Manual; Available online at: http://www.georgiastormwater.com/

CWP, April 2009. Coastal Stormwater Supplement (CSS) to the Georgia Stormwater Management Manual, First Edition; Available on-line: http://www.georgiastormwater.com/

CWP. Managing Stormwater in Your Community: A Guide for Building an Effective Post Construction Program; Available on-line: http://www.cwp.org/documents/cat_view/76-stormwater-management-publications/90-managing-stormwater-in-your-community-a-guide-for-building-an-effective-post-construction-program.html.

H. Harper, April 1, 2011, Common Pitfalls in BMP Selection and Implementation, ASCE-EWRI Water Resources Seminar Orlando, Florida

Holland, A.F., D.M. Sanger, C.P. Gawle, S.B. Lerberg, M.S. Santiago, G.H.M. Riekerk, L.E. Zimmerman, and G.I. Scott. 2004. Linkages between tidal creek ecosystems and the landscape and demographic attributes of their watersheds. Journal of Experimental Marine biology and Ecology.

South Carolina Department of Health and Environmental Control (SCDHEC), August 2005. South Carolina Storm Water Management BMP Handbook; Available online at: http://www.scdhec.gov/environment/ocrm/bmp_docs.htm

SCDHEC & AMEC, 2010. Georgetown County, SC 319 Project

SCDHEC & AMEC, 2010. Lexington County, SC 319 Project

Town of Bluffton. 2008. Waterbody management plan for the May River. Available online at: http://www.townofbluffton.com/epa/waterbodyplan6.16.08.pdf